ANCIENT JEWISH CALENDATION

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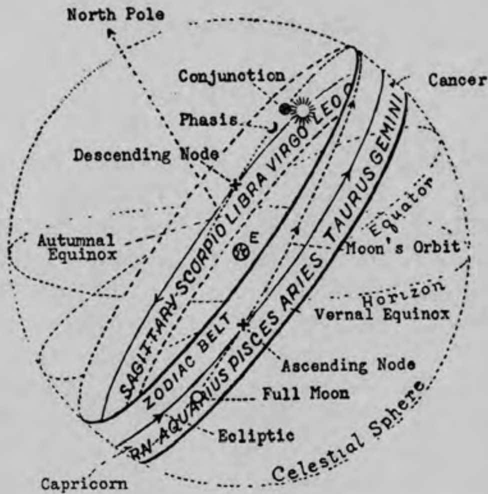
I. The Problem

IN 1903, the *Journal of Philology* published the well known article by J. K. Fotheringham —"The Date of the Crucifixion." In 1913, David Sidersky made a contribution to chronology concerning ancient Jewish time, including a brief analysis of the lunar computations of Maimonides. In 1928, Karl Schoch publicly replied (*Biblica*) to Gerhardt's erroneous computation of the March new moon in 30 A. D. These calendrical discussions are outstanding because each represents an astronomical argument that lights up the field of early Jewish dates, although there is no united conclusion concerning them. Recently George Ogg (1939) has carefully reviewed and summarized numerous writings of early Christian historians with reference to the crucifixion date, but makes the significant statement that he cannot draw a definite conclusion from these ancient records. Therefore, to some it seems futile to continue research in crucifixion chronology, while by others it is looked upon as the only true foundation of all the scripture dates.

And indeed it can be stated that no ancient Jewish date is described with so great chronological detail as the crucifixion date. Consequently, in this realm of Jewish research, contributions on an astronomical and calendrical basis, and from the vitally related viewpoint of biblical archaeology, are on the increase. The past forty years represent a marvelous unfolding of the relation between the defined motion of the moon and her requisite place on the primitive Jewish calendar. If Fotheringham had made his computations on the basis of the true paschal season in ancient Israel, his moon table would be a classic in early Jewish

reckoning;[1] for he calculated all the new moons cited, giving in each instance the distance of the phasis from perigee, and the longitude of the moon's ascending node. His long translation period in March, 30 A. D., is therefore significant, as also his resultant passover date on Saturday, April 8, for that year.



MOON'S APPARENT MONTHLY COURSE IN ZODIAC BELT

Through the center of the Zodiac Belt runs the *ecliptic*, or sun's apparent path in the sky, as seen from the earth. The moon's apparent path is also projected by the eye upon the zodiac, around which she appears to travel every month. Though millions of miles apart, the paths of both sun and moon seem to be traced upon the same celestial surface. In one month's time the sun advances one sign only, while the moon travels through nearly the whole zodiac. The moon's orbit is inclined to the ecliptic by an angle of about five degrees. When nearest the earth, the moon's position is called *perigee*; when farthest from the earth, it is called *apogee*.

The moon passes through the zodiac with an irregular velocity. Her course runs alternately about two weeks north of the sun, and two weeks south of the sun. Her smallest daily movement amounts to 11° 6′ 35″, and her largest, 15° 14′ 35″.* The sun requires six months to go from Aries to

[1] J. K. Fotheringham, "The Date of the Crucifixion," *Journal of Philology*, XXIX (1903), 107.

*Geminus, "Elementa Astronomiae," *Uranologion*, 211.

Libra, or from the vernal equinox to the autumnal; the moon apparently travels this distance in about two weeks; while the earth, in her daily revolution, turns from Aries to Libra in 12 hours. The time from conjunction to phasis is called the "translation period," and this varies from one to four days according to the place of the moon.

The accompanying diagram represents the *apparent* course only of the sun and moon. The center of the solar system is, of course, the sun, around which the earth and her lunar satellite revolve, along with the other planets.

But other authorities in lunar astronomy have also failed as yet to employ the indispensable features that gave character to the primitive Jewish calendar. These are (1) the relation of the Jewish first month to a characteristic agricultural season; and (2) a 14-Nisan passover on the next day after the Jewish day of full moon in Jerusalem. The first feature is fully recognized by ancient chronologers, and is frequently mentioned in their discussions. The principle is luni-solar, because it tied the first lunar month to the solar season of first fruits. But no computation of early Jewish cycles seems to be based upon this principle. Modern interpretations of the ancient form of calendar commonly place the passover at the first full moon after the vernal equinox, and often in March when the new fruits could not possibly be ripe in Palestine. Consequently, a lunar calendar cycle, constructed according to the seasonal limits of the first ripe fruits of Palestine — the barley harvest — would revive the apparently forgotten principle that regulated the time of the ancient Jewish first month.

The second feature of the ancient Jewish calendar fixed the relation of the paschal feast to both full moon and new moon, and this law is confirmed by calendrical principles that are under control of the moon's motion. The operation of both features is verified and supported by the synthetic dates of Scripture and related Jewish history, and these preclude certain recognized systems of lunar time from becoming the model upon which to construct the ancient Jewish calendar.

1. The law of the first fruits could not operate in the wind, snow, and rain of Palestinian March, and it therefore represents a principle that prevents the modern Jewish calendar from becoming an exponent of the ancient system. The rabbinical

deḥîyôth are a second objection, for they have not as yet been shown to have been a corollary of early Jewish measurement of time. The modern Jewish passover date on 15 Nisan is an additional objection, for the OT fully sets forth the 14 Nisan as the original passover date, upon which the lamb was sacrificed and eaten. Furthermore, a 15-Nisan passover, if coinciding with the full moon, periodically contravenes the astronomical relation between the conjunction and phasis, making the translation period altogether too short, and at times even anticipating the conjunction by the calendar phasis!

2. The Pentateuchal passover date on 14 Nisan, with its recurring long translation periods at the beginning of the month, do not agree with the correspondingly shorter translation periods of the ancient Babylonian calendar,[2] although the Nisan phasis on both Jewish and Babylonian meridians was of course connected with the same conjunction unless the intercalation differed. However, the Babylonian reckoning did not recognize the second outstanding principle of ancient Jewish time — its full-moon relation to the passover — and hence does not commonly check with the synchronizing dates of Jewish history. This is demonstrated by the Assuan papyri and their Aramaic dates, only one of which exactly agrees with the Jewish phasis, as determined by Nehemiah and Ezra synchronisms; while two differ by a whole month, one by three days, and the rest by two days.[3] The new moon of the Cambyses 400 Tablet also differs by two days from Jewish new-moon reckoning.

Therefore, neither the modern calculated luni-solar calendar of the Jews, nor the purely observed calendar of ancient Babylon, with its irregular lunar month, and short translation periods, agrees with the ancient Jewish calendar, which is consistently founded upon the law of the barley harvest and upon the 14-Nisan passover date and its full-moon relationship.

[2] In Dr. O. Neugebauer's computation of the Babylonian cuneiform texts of the Seleucid era — not yet published — the translation period never extends to the third day after the day of conjunction as periodically does the Jewish reckoning.

[3] Richard A. Parker, "Persian and Egyptian Chronology," *American Journal of Semitic Languages and Literatures*, LVIII (1941), 289.

Consequently, supplemental to the gospel date of the crucifixion, are the genetic laws of the ancient Israelite calendar, and the equally requisite laws pertaining to lunar astronomy and the principles of calendation. These three sources, together with other synchronal dates of Jewish history, represent a consistent foundation upon which ancient Jewish calendation can be framed.

With reference to synchronisms in general, if the regnal year, the day of the week, and the Jewish feast date are known, then the method of calendation employed is at once demonstrable. It is not insisted that the calendar reckoning here presented in support of ancient Jewish time is the method employed by the primitive Hebrews, although the relation must be close on account of the astronomical principles involved. Furthermore, by solving ancient Jewish synchronisms, it answers the challenge that no one knows how the ancient Jews reckoned time.

The scriptural events introduced into the argument are those only that hold an identifying relation to chronology. The astronomical principles governing the calendar moon are the chief basis for the conclusions, and they have been substantiated during a period of several years' collaboration with Glen H. Draper, Associate Astronomer, U. S. Naval Observatory, Washington, D. C. His watchful insistence with reference to the laws of lunar astronomy is gratefully acknowledged. The dates presented are both calculated and observed — *observed* in the sense that they are in harmony with the moon's position as nearly as can be accomplished by the calendar moon. The accompanying Nisan moon-tables are taken from a forthcoming series of Nisan new-moon reckoning.

FIRST CENTURY MOONS AND INTERVALS TABLE I
(Jerusalem Civil Time)

	A. D.	*Conjunction*	*1 Nisan*	*Day of Week*	*Tr. Period (Days)*	*Full Moon*	*14 Nisan*	*Waxing Period (Days)*	*Year Length (Days)*	
	1*	Apr 12.49	Apr 14	Thur	1.28	Apr 26.40	Apr 27	13.91	355	
	2	Apr 1.72	Apr 4	Tues	2.05	Apr 15.91	Apr 17	14.19	384	
	3*	Apr 20.41	Apr 23	Mon	2.36	May 4.90	May 6	14.49	354	
	4	Apr 8.44	Apr 11	Fri	2.33	Apr 23.62	Apr 24	15.18	355	
	5	Mar 28.69	Apr 1	Wed	3.07	Apr 13.22	Apr 14	15.53	384	
	6*	Apr 16.60	Apr 20	Tues	3.17	May 2.09	May 3	15.49	354	
	7	Apr 6.25	Apr 9	Sat	2.52	Apr 21.31	Apr 22	15.06	354	
	8	Mar 25.96	Mar 28	Wed	1.80	Apr 9.33	Apr 10	14.37	384	
	9*	Apr 13.94	Apr 16	Tues	1.83	Apr 28.02	Apr 29	14.08	354	
	10	Apr 3.38	Apr 5	Sat	1.39	Apr 17.33	Apr 18	13.95	355	
	11	Mar 23.53	Mar 26	Thur	2.23	Apr 6.90	Apr 8	14.37	384	
	12*	Apr 10.23	Apr 13	Wed	2.54	Apr 24.92	Apr 26	14.69	354	
	13	Mar 30.28	Apr 2	Sun	2.48	Apr 14.61	Apr 15	15.33	384	
	14*	Apr 18.09	Apr 21	Sat	2.68	May 3.58	May 4	15.49	355	
	15	Apr 7.57	Apr 11	Thur	3.20	Apr 22.99	Apr 24	15.42	354	
	16	Mar 27.25	Mar 30	Mon	2.51	Apr 11.11	Apr 12	14.86	384	
	17*	Apr 15.27	Apr 18	Sun	2.50	Apr 29.78	May 1	14.51	354	
	18	Apr 4.89	Apr 7	Thur	1.88	Apr 18.89	Apr 20	14.00	354	
	19	Mar 25.26	Mar 27	Mon	1.50	Apr 8.27	Apr 9	14.01	384	
	20*	Apr 12.00	Apr 14	Sun	1.77	Apr 26.21	Apr 27	14.21	355	
	21	Apr 1.03	Apr 4	Fri	2.73	Apr 15.92	Apr 17	14.89	384	
	22*	Apr 19.74	Apr 23	Thur	3.03	May 4.93	May 6	15.19	354	
	23	Apr 9.00	Apr 12	Mon	2.77	Apr 24.53	Apr 25	15.53	355	
	24	Mar 28.55	Apr 1	Sat	3.20	Apr 12.86	Apr 14	15.31	383	
	25*	Apr 16.57	Apr 19	Thur	2.20	May 1.58	May 2	15.01	354	
	26	Apr 6.28	Apr 8	Mon	1.49	Apr 20.60	Apr 21	14.32	355	
	27	Mar 26.83	Mar 29	Sat	1.93	Apr 9.76	Apr 11	13.93	383	
Crucifixion Period	28*	Apr 13.68	Apr 15	Thur	1.09	Apr 27.62	Apr 28	13.94	355	
	29	Apr 2.82	Apr 5	Tues	1.95	Apr 17.21	Apr 18	14.39	355	
	30	Mar 22.84	Mar 26	Sun	2.92	Apr 6.93	Apr 8	15.09	384	
	31*	Apr 10.58	Apr 14	Sat	3.19	Apr 25.94	Apr 27	15.36	354	
	32	Mar 29.95	Apr 2	Wed	2.81	Apr 14.47	Apr 15	15.52	384	
	33*	Apr 17.90	Apr 21	Tues	2.87	May 3.29	May 4	15.39	354	6939
	34	Apr 7.58	Apr 10	Sat	2.19	Apr 22.40	Apr 23	14.82	354	
	35	Mar 28.27	Mar 30	Wed	1.49	Apr 11.43	Apr 12	14.16	384	
	36*	Apr 15.21	Apr 17	Tues	1.56	Apr 29.19	Apr 30	13.98	354	
	37	Apr 4.56	Apr 6	Sat	1.21	Apr 18.59	Apr 19	14.03	355	
	38	Mar 24.62	Mar 27	Thur	2.14	Apr 8.23	Apr 9	14.61	384	
	39*	Apr 12.31	Apr 15	Wed	2.46	Apr 27.25	Apr 28	14.94	355	
	40	Mar 31.46	Apr 4	Mon	3.30	Apr 15.92	Apr 17	15.46	384	
	41*	Apr 19.33	Apr 23	Sun	3.44	May 4.85	May 6	15.52	354	
	42	Apr 8.87	Apr 12	Thur	2.90	Apr 24.15	Apr 25	15.28	354	
	43	Mar 29.58	Apr 1	Mon	2.18	Apr 13.21	Apr 14	14.63	384	
	44*	Apr 16.60	Apr 19	Sun	2.17	Apr 30.90	May 2	14.30	354	
	45	Apr 6.14	Apr 8	Thur	1.63	Apr 20.07	Apr 21	13.93	354	
	46	Mar 26.40	Mar 28	Mon	1.42	Apr 9.55	Apr 10	14.15	384	
	47*	Apr 14.11	Apr 16	Sun	1.66	Apr 28.54	Apr 29	14.43	355	
	48	Apr 2.14	Apr 5	Fri	2.63	Apr 17.26	Apr 18	15.12	355	
	49	Mar 22.35	Mar 26	Wed	3.41	Apr 6.88	Apr 8	15.53	384	
	50*	Apr 10.25	Apr 14	Tues	3.52	Apr 25.77	Apr 27	15.52	354	

*The asterisk marks the years having a Veadar spring.
Conjunction and full-moon dates taken from Ginzel's *Chronologie*.

FIRST CENTURY MOONS AND INTERVALS TABLE II
(Jerusalem Civil Time)

	A. D.	*Conjunction*	*1 Nisan*	*Day of Week*	*Tr. Period (Days)*	*Full Moon*	*14 Nisan*	*Waxing Period (Days)*	*Year Length (Days)*	
	51	Mar 30.88	Apr 3	Sat	2.88	Apr 14.99	Apr 16	15.11	383	
	52*	Apr 17.91	Apr 20	Thur	1.86	May 2.68	May 3	14.77	354	6940
	53	Apr 7.58	Apr 9	Mon	1.19	Apr 21.72	Apr 22	14.14	355	
	54	Mar 28.05	Mar 30	Sat	1.71	Apr 10.99	Apr 12	13.94	384	
	55*	Apr 15.86	Apr 18	Fri	1.91	Apr 29.90	May 1	14.04	354	
	56	Apr 3.91	Apr 6	Tues	1.86	Apr 18.54	Apr 19	14.63	355	
	57	Mar 23.96	Mar 27	Sun	2.80	Apr 8.26	Apr 9	15.30	384	
	58*	Apr 11.76	Apr 15	Sat	3.01	Apr 27.24	Apr 28	15.48	354	
Paul's Arrest	59	Apr 1.22	Apr 4	Wed	2.55	Apr 16.67	Apr 17	15.45	384	
	60*	Apr 19.20	Apr 22	Tues	2.57	May 4.44	May 5	15.24	354	
	61	Apr 8.90	Apr 11	Sat	1.87	Apr 23.48	Apr 24	14.58	354	
	62	Mar 29.54	Mar 31	Wed	1.22	Apr 12.57	Apr 13	14.03	384	
	63*	Apr 17.45	Apr 19	Tues	1.32	May 1.37	May 2	13.92	355	
Jewish Revolt	64	Apr 5.69	Apr 8	Sun	2.08	Apr 19.86	Apr 21	14.17	354	
	65	Mar 25.72	Mar 28	Thur	2.04	Apr 9.55	Apr 10	14.83	384	
	66*	Apr 13.42	Apr 16	Wed	2.35	Apr 28.57	Apr 29	15.15	355	
	67	Apr 2.66	Apr 6	Mon	3.11	Apr 18.18	Apr 19	15.52	354	
	68	Mar 22.19	Mar 25	Fri	2.57	Apr 6.54	Apr 7	15.35	384	
	69*	Apr 10.20	Apr 13	Thur	2.57	Apr 25.28	Apr 26	15.08	354	
	70	Mar 30.91	Apr 2	Mon	1.85	Apr 14.29	Apr 15	14.38	384	
	71*	Apr 18.89	Apr 21	Sun	1.88	May 2.99	May 4	14.10	354	6940
	72	Apr 7.35	Apr 9	Thur	1.42	Apr 21.29	Apr 22	13.94	355	
	73	Mar 27.52	Mar 30	Tues	2.24	Apr 10.85	Apr 12	14.33	384	
	74*	Apr 15.20	Apr 18	Mon	2.57	Apr 29.87	May 1	14.67	354	
	75	Apr 4.25	Apr 7	Fri	2.52	Apr 19.56	Apr 20	15.31	355	
	76	Mar 23.59	Mar 27	Wed	3.17	Apr 8.13	Apr 9	15.54	384	
	77*	Apr 11.53	Apr 15	Tues	3.24	Apr 26.97	Apr 28	15.44	354	
	78	Apr 1.20	Apr 4	Sat	2.56	Apr 16.09	Apr 17	14.89	384	
	79*	Apr 20.23	Apr 23	Fri	2.54	May 4.76	May 6	14.53	354	
	80	Apr 8.85	Apr 11	Tues	1.92	Apr 22.85	Apr 24	14.00	354	
	81	Mar 29.23	Mar 31	Sat	1.53	Apr 12.23	Apr 13	14.00	384	
	82*	Apr 16.97	Apr 19	Fri	1.80	May 1.17	May 2	14.20	355	
	83	Apr 6.00	Apr 9	Wed	2.77	Apr 20.87	Apr 22	14.87	354	
	84	Mar 25.12	Mar 28	Sun	2.64	Apr 9.55	Apr 10	15.43	384	
	85*	Apr 12.97	Apr 16	Sat	2.80	Apr 28.49	Apr 29	15.52	355	
	86	Apr 2.51	Apr 6	Thur	3.26	Apr 17.83	Apr 19	15.32	354	
	87	Mar 23.20	Mar 26	Mon	2.56	Apr 6.90	Apr 8	14.70	383	
	88*	Apr 10.23	Apr 12	Sat	1.54	Apr 24.57	Apr 25	14.34	355	
	89	Mar 30.79	Apr 2	Thur	1.97	Apr 13.72	Apr 15	13.93	383	
	90*	Apr 18.65	Apr 20	Tues	1.12	May 2.58	May 3	13.93	355	6940
	91	Apr 7.79	Apr 10	Sun	1.98	Apr 22.17	Apr 23	14.38	355	
	92	Mar 26.82	Mar 30	Fri	2.94	Apr 10.88	Apr 12	15.06	384	
	93*	Apr 14.55	Apr 18	Thur	3.22	Apr 29.88	May 1	15.33	354	
	94	Apr 3.89	Apr 7	Tues	2.88	Apr 19.42	Apr 20	15.53	354	
	95	Mar 24.50	Mar 27	Fri	2.26	Apr 8.68	Apr 9	15.18	384	
	96*	Apr 11.52	Apr 14	Thur	2.25	Apr 26.37	Apr 27	14.85	354	
	97	Apr 1.21	Apr 3	Mon	1.55	Apr 15.39	Apr 16	14.18	384	
	98*	Apr 20.16	Apr 22	Sun	1.61	May 4.14	May 5	13.98	354	
	99	Apr 9.52	Apr 11	Thur	1.25	Apr 23.53	Apr 24	14.01	355	
	100	Mar 28.59	Mar 31	Tues	2.17	Apr 12.17	Apr 13	14.58	384	

*The asterisk marks the years having a Veadar spring.
Conjunction and full-moon dates taken from Ginzel's *Chronologie*.

JEWISH-CALENDAR WEEK TABLE III

Nisan	Iyar	Sivan	Tammuz	Ab	Elul	Tishri	Ḥesvan	Kisleu	Tebet	Shebat	Adar	Veadar
1–	1	1	1	1	1	1	1	1	1–	1	1	1
2	2	2	2	2–	2	2	2	2	2	2	2	2
3	3	3	3–	3	3	3	3	3–	3	3	3	3
4	4	4	4	4	4	4	4–	4	4	4	4	4–
5	5	5–	5	5	5	5	5	5	5	5	5–	5
6	6–	6	6	6	6	6–	6	6	6	6	6	6
7	7	7	7	7	7–	7	7	7	7	7–	7	7
8–	8	8	8	8	8	8	8	8	8–	8	8	8
9	9	9	9	9–	9	9	9	9	9	9	9	9
10	10	10	10–	10	10	10	10	10–	10	10	10	10
11	11	11	11	11	11	11	11–	11	11	11	11	11–
12	12	12–	12	12	12	12	12	12	12	12	12–	12
13	13–	13	13	13	13	13–	13	13	13	13	13	13
14	14	14	14	14	14–	14	14	14	14	14–	14	14
15–	15	15	15	15	15	15	15	15	15–	15	15	15
16	16	16	16	16–	16	16	16	16	16	16	16	16
17	17	17	17–	17	17	17	17	17–	17	17	17	17
18	18	18	18	18	18	18	18–	18	18	18	18	18–
19	19	19–	19	19	19	19	19	19	19	19	19–	19
20	20–	20	20	20	20	20–	20	20	20	20	20	20
21	21	21	21	21	21–	21	21	21	21	21–	21	21
22–	22	22	22	22	22	22	22	22	22–	22	22	22
23	23	23	23	23–	23	23	23	23	23	23	23	23
24	24	24	24–	24	24	24	24	24–	24	24	24	24
25	25	25	25	25	25	25	25–	25	25	25	25	25–
26	26	26–	26	26	26	26	26	26	26	26	26–	26
27	27–	27	27	27	27	27–	27	27	27	27	27	27
28	28	28	28	28	28–	28	28	28	28	28–	28	28
29–	29	29	29	29	29	29	29	29	29–	29	29	29
30		30		30–		30	(30)	(30)		30	(30)	

From Table IV the day of the week is determined for any Jewish date. Hyphens mark the beginning of each week as counted from the first day of Nisan. Upon whatever day of the week 1 Nisan falls, all the succeeding weeks to the last of Ḥesvan begin on the same week day. The length of the lunar year determines how each month and week shall begin after Ḥesvan. Throughout the whole year, however, the 8th, 15th, 22nd, and 29th days of a month are always the same day of the week as the first day of the month.

These permanent calendar features make it possible to compute easily any date between the marked weeks. If, for example, 1 Nisan is Tuesday, then every hyphened date for the first eight months is Tuesday; and 24 Elul, counting from Tuesday, 21 Elul, would be Friday.

The following rules govern the weeks that follow Ḥesvan:

1. In a 354-day year, the weeks begin on the same day of the week as 1 Nisan throughout the year.

2. In a 355-day year, the weeks following Ḥesvan, which gains a day, begin a day later.

3. In a 384-day year, the weeks all begin on the same day of the week except for the last month, where they begin a day later because one day has been added to Adar prior.

3. In a 383-day year, the weeks after Kisleu, which loses a day, and on to the end of Adar, begin a day earlier. After Adar, they begin a day later.

TISHRI CALENDAR TABLE IV

(1 Nisan+177 days=1 Tishri)

1 Nisan	*1 Tishri*	*1 Nisan*	*1 Tishri*
Mar 23	Sept 16	Apr 9	Oct 3
Mar 24	Sept 17	Apr 10	Oct 4
Mar 25	Sept 18	Apr 11	Oct 5
Mar 26	Sept 19	Apr 12	Oct 6
Mar 27	Sept 20	Apr 13	Oct 7
Mar 28	Sept 21	Apr 14	Oct 8
Mar 29	Sept 22	Apr 15	Oct 9
Mar 30	Sept 23	Apr 16	Oct 10
Mar 31	Sept 24	Apr 17	Oct 11
Apr 1	Sept 25	Apr 18	Oct 12
Apr 2	Sept 26	Apr 19	Oct 13
Apr 3	Sept 27	Apr 20	Oct 14
Apr 4	Sept 28	Apr 21	Oct 15
Apr 5	Sept 29	Apr 22	Oct 16
Apr 6	Sept 30	Apr 23	Oct 17
Apr 7	Oct 1	Apr 24	Oct 18
Apr 8	Oct 2	Apr 25	Oct 19

Table IV presents a simple method of reckoning the autumn feast dates for any Jewish year. Upon whatever day of the week the Nisan new year falls, the Tishri new year will fall on the second week day after. If 1 Nisan is on Monday, then 1 Tishri is Wednesday. Hence the Feast of Tabernacles on 15 Tishri, always began on the second day after the day of the week that marked the first day of Nisan.

The observed position of the Tishri new moon would not differ much from its calculated position, for six mean lunations — 6 x 29.53 days = 177.18 days — if reckoned from the sunset beginning of 1 Nisan, would reach only a little beyond the sunset beginning of 1 Tishri.

Furthermore, according to the Talmud, before the fixed Jewish calendar came into form, the month Elul always had 29 days.* Any question as to the Julian dating of the Jewish dates following the Tishri new year is answered by the synchronal dates of the Bible and related Jewish history.

II. Nature of the Ancient Jewish Calendar

The scripture date of the death of Christ is a chronological synchronism. The day of the week is known, also the Jewish feast date, and the geographical meridian on which the crucifixion moon is reckoned. In addition, salient details with reference to the moon's visibility are known — the anomaly of the moon, the inclination of the sun's path to the horizon, the latitude of the observer, and the sign of the zodiac — features that have a determining relation to the first appearance of every Jewish new moon, and hence to the subsequent civil dates of the month itself. The genetic paschal feast laws regulating the month and date of the passover are of Pentateuchal origin, and testimonies can be cited regarding Jewish feast practice in the first century.[4] The year only is unknown, although there are calendrical and historical clues that point to its identity. The gospel narrative identifies the season.[5]

And one must proceed to discover the Julian civil year of the crucifixion and its associate passover by equating the known day of the week — Friday — with its coincident 14-Nisan paschal date, and the corresponding position of the Nisan moon. It is the purpose of this study to demonstrate more fully that only

*Landau, J., *Commentary on Beza*, p. 16.
Babylonian Talmud, Sukka 54 b. Tr. Epstein. 1938.
Schaumberger, P. Joh., "The 14th Nisan, and the Day of the Crucifixion and the Synoptists." *Biblica*, IX (1928), Fasc. i.

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[4] Philo, *Life of Moses*, II, 224; *Decalogue*, 159. Maimonides, *Tractatus Primus de Sacrificio Paschali*, tr. de Compiegne de Veil, London, 1683, cap. I, p. 4. Josephus, *Antiquities*, XVII, ix, 3; *Wars*, II, ii, 3. These authoritative references point to a "private altar" sacrifice in the first century — the lamb being slain by the individual at his own door.

[5] The crucifixion passover was a late-season feast, when the leaves were on the trees; cf. Luke 21 29, 30. The lateness of the fishing season, as in John 21, is also witness.

the pentateuchal 14-Nisan date agrees with the crucifixion scene and with the astronomical and ancient laws governing the place of the calendar moon, and that it represents the fundamental principle of all the OT and NT dates.

But it is unessential, and also impossible, that exact coincidence between the moon and the calendar should always be present. No lunar calendar, either calculated or observed, has ever been able to accomplish this — not even the observed calendar of Muḥarram. The following is a co-statement from Scaliger and Bucherius on this point:

> Hence it is most foolish what certain Jews write — ancient as well as modern — that when each temple was standing, it was the custom to designate the new moons from the appearance of the moon. The Mohammedans, who begin the new moon of Muharram on the third day or second day from the conjunction of the luminaries, could not guarantee this. For not in every new moon, not even in a cloudless sky, could they see the moon. Thus Scaliger. [Bucherius continues.] And with this opinion I seem to agree, because in the cited Talmud, it is said to have sometimes happened that a certain form and likeness of the moon would appear on the 27th day, and the people would all shout, "Mekudash, Mekudash, sanctificata est, sanctificata est!" But by Rabbi Simeon, son of Gamaliel, the adviser, it was decreed that, according to the calculation of the synagogue, the new moon would be designated on the next day.[6]

Fotheringham also offers confirmatory testimony relating to the Mohammedan calendar:

> For religious purposes the beginning of each month is fixed by observation of the lunar crescent. For the purposes of civil life there has never been an exact rule, and different beginnings of the month have been used by different people living in the same town. It is, therefore, impossible to give an exact interpretation to a date expressed in this calendar unless the day of the week is given as well as the day of the month.[7]

Albîrûnî, an Arabian chronicler, also agrees:

> The variation in the appearance of the new-moon does not depend alone upon the latitudes, but to a great extent also upon the longitudes of the countries. For, frequently, new-moon is not seen in some place, whilst she *is* seen in another place not far to the west; and frequently she is seen in

[6] Aegidii Bucherii, *De Doctrina Temporum*, Antverpiae, 1634, 373.
[7] J. K. Fotheringham, *British Nautical Almanac*, 1935, 768.

both places at once. This is one of the reasons for which it would be necessary to have special calculations and tables for every single degree of longitude.[8]

And the following is a testimony of weight from Schwarz, who is writing concerning the genesis of Jewish time:

For since the visibility of the new moon depends upon the position of the ecliptic as against the horizon, it cannot be determined in advance [that is, by observation only] that one or the other month shall be full or deficient. It is just as possible to have two full months follow each other as for two deficient.[9]

A recent personal communication from Dr. Richard Parker (University of Chicago) gives a significant calculation of a consecutive series of four 30-day months in his Babylonian calendar research:

			30 days	30	30	30	
621 B. C.	9/3	(Ululu)	10/3	11/2	12/2	1/1	(Tebetu)
436 B. C.	8/29	(Ululu)	9/28	10/28	11/27	12/27	(Tebetu)
136 B. C.	7/14	(Duzu)	8/13	9/12	10/12	11/11	(Arahsamnu)
119 B. C.	8/5	(Abu)	9/4	10/4	11/3	12/3	(Kislimu)
117 B. C.	8/12	(Abu)	9/11	10/11	11/10	12/10	(Kislimu)
111 B. C.	5/10	(Aiaru)	6/9	7/9	8/8	9/7	(Ululu)
33 A. D.	6/17	(Simanu)	7/17	8/16	9/15	10/15	(Tashritu)

He adds: "They result from the coincidence of the lengthening lunar period and the lengthening of the time period required for visibility."

The ancient Jewish people must have experienced all these variations in purely astronomical calculation and observation of the moon. And it is immediately evident that if, from the time of Ezra, the primitive Jewish calendar was built up upon observation alone, the center of observing the moon could not have been Babylon. For although after the exile, the Jews returned to Palestine with Babylonian names of the lunar months on their calendar, yet it is inconsistent to substitute the meridian of Babylon for that of Jerusalem in Jewish calendation, without some

[8] Albîrûnî, *The Chronology of Ancient Nations*, tr. Sachau, London, 1879, 77 f.

[9] Adolf Schwarz, *Der jüdische Kalender*, Breslau, 1872, 10, n. 2.

record of a change that would have thrust uncertainty and irregularity into the whole Jewish feast period. When the change did finally come in post-Talmudic times it stirred up such a fierce polemic in Jewry that a new sect arose in the 10th century with a new Jewish calendar to meet the issue.[10] Furthermore, the context in Exodus 12 provides evidence that an important calendar change in Israel would be announced by divine command.

Moreover, if the ancient Jewish calendar moon had at any time been controlled by Babylonian reckoning, then the calendar would possibly have been governed by the principles of observation alone. An irregular length of year and month would have been the result, and the precise calendar festal dates could not have been given out in advance. Intercalation would have been uncertain, and the scattered Jews would not have known whether to go up to the temple in March or April. For the Babylonians inserted their leap month sometimes in the spring, and then again in the autumn.[11] And, like ancient Babylon,[12] Ezra and Nehemiah would have continued to count their regnal years from Nisan instead of Tishri.[13]

Perhaps the most outstanding evidence that opposes Babylonian observation as a pilot control of the Jewish festal calendar is the fact that the new moons of the Ezra and Nehemiah dates respond to astronomical calculation, but not to the Babylonian new-moon reckoning which controls the Aramaic dates of the Assuan papyri.[14]

Important testimony supporting ancient Jewish *calculation* concerns the thirty-day Jewish month, at the end of which the new moon, or φάσις, might appear a day early in the western sky at even. The early Jews provided for this astronomical uncer-

[10] Samuel Poznanski, *Jewish Quarterly Review*, X (1897), 152–161.

[11] Dr. O. Neugebauer (Brown University) in a personal communication.

[12] Heinrich, Zimmern, "Zum bablyonischen Neujahrsfest," *Aus den Berichten der philologisch-historischen Klasse der königlich-sächsischen Gesellschaft der Wissenschaften zu Leipzig*, LVIII, 1903.

[13] Cf. Neh 1 1, 2 1, and 5 14. The king's reign does not change between Chisleu and the subsequent Nisan, and even to the time when Nehemiah was appointed governor. Then the new reign must have begun in Tisrhi!

[14] Richard A. Parker, "Persian and Egyptian Chronology," *American Journal of Semitic Languages and Literatures*, LVIII (1941), 289.

tainty by keeping a double new-moon sabbath at the end of each full month. They feasted the *triakade*, or *tricesima sabbath*, as the last day of the old month, while the first day of the new month was called Rosh Ḥodesh as usual, and from it the days of the new month were counted. This new-moon superstition is very old, and is frequently mentioned in ancient literature.[15] It is referred to by Horace in his ninth satire. The poet is conversing with his friend Fuscus Aristius:

> Horace: "Certainly I do not know why you wish to speak secretly with me," you were saying.
> Fuscus: I remember well, but in a better time let me speak: today is *tricesima sabbata*: do you wish to offend the circumcised Jews?
> Horace: I say I have no scruples.
> Fuscus: As for me, I am a little weaker, one of many: pardon me, at another time let me speak.
> Horace: What have I done to deserve such bad luck? The reprobate flees, and leaves me with a halter around my neck.[16]

This Horatian verse is witness that before the time of Christ calculation was a definite feature of the Jewish calendar. In those days the new-moon feast was observed on the 30th day of the month whether the new moon appeared or not.[17] Hence it is obvious that the full and deficient months had to be known in advance. This calendar custom has continued in Jewry even to the present time.[18]

From this brief analysis of the nature of ancient Jewish calendation, it is a consistent conclusion that a calendar based only upon the laws of lunar visibility, such as for example, the computations of Maimonides, or any of the several tables similar to his reckoning,[19] could not identify ancient dates that were also

[15] Scaliger, *De Emendatione Temporum*, Francofurt, 1593, 5 (proleg.), 168.

[16] Q. Horati Flacci, *Satires*, I, ix, 67–74; Thomas Keightly, *Satires and Epistles of Horace*, London, 1848, 83.

[17] Bucherii, *De Doctrina Temporum*, Antverpiae, 1634, 384.

[18] Cf. any Jewish almanac, and note the second new-moon day at the end of each 30-day month.

[19] "The method of calculation and the rules of visibility of the crescent described by Maimonides in presenting them as traditions handed down by the Jewish scientists, are of Chaldean origin."— David Sidersky, *Revue d'Assyriologie*, XVI (1919).

governed by Jewish festal rules. Therefore, a computation that represents the ancient form of calendar, must be tied to the basic precepts of Jewish religious practice, as well as to the astronomical principles that conform to the motion of the moon. All these principles together involve four specific relationships:

a. Relation, or difference in time, between the passover day and the Jewish day of full moon.
b. Difference in time between the conjunction and phasis — the translation period.
c. Difference in time between the phasis sunset and the sunset beginning of the passover.
d. Ratio between the translation period and the moon's waxing period.

The method of moon-reckoning about to be presented rests upon pentateuchal and astronomical law, and it checks with the ancient Jewish synchronisms.

III. Active Principles Governing the Moons of Ancient Jewish Time

1. *Pentateuchal Barley-Harvest Law.* In ancient times, the law commanded Israel that a handful of the first fruits of the land should be presented to the priest for an offering at passover time before any bread, parched corn, or green ears should be eaten by the people. This was to be a statute forever throughout their generations in all their dwellings (Lev 23 10–14). By this law the ancient Hebrew year was regulated, and the full moon of barley harvest marked the first month of the year, which was called Abib, signifying new fruits or "green ears" (Deut 16 1). Consequently, the sickle became the sign of the first month and the paschal season.[20]

The law of the first fruits could not operate in the cold winds and snow of Palestinian March,[21] and therefore it is certain that

[20] Bucherii, *De Doctrina Temporum*, Antverpiae, 1634, 472. The author is citing Theophilus.

[21] Dalman gives March the character of a winter month, with a snowfall equal to that of January.— *Arbeit und Sitte in Palestina*, Gütersloh, 1928, III, ii, 305.

the original Jewish passover feast did not occur so early as March. In the neighborhood of Jerusalem, the earliest ripe barley occurs in April, near the end of the first week, and the harvest itself lasts until about June 1.[22]

So long as the passover could be governed by the moon of barley harvest, it was not necessary for Israelite reckoning to employ a cycle in order to determine the first month of the year. The ripening barley was the key. This is doubtless the important reason why the intercalary year as such is not mentioned in the Bible.[23] But after the fall of the Second Temple, the scattered and persecuted Jews had ultimately to follow the dictates of the Roman state, and also of the Church, which (a) based her feasts upon the March-passover cycle of the Nicaean Synod and of Dionysius Exiguus,[24] and (b) insisted that Jews and Christians should not keep the passover at the same time.[25]

Inasmuch as the Church chose the passover of the resurrection as a basis for her feasts, placing Easter on the first Sunday after the equinoctial full moon, the Jews had no alternative but to take the first full moon after the spring equinox as their paschal season. As a result, from the fourth century onward, Jews and Christians alike had March passovers on their calendars. But, according to Scaliger, the Church thought "that they were celebrating the passover in Nisan."[26]

The barley-harvest law, when applied to a continuous series of years, is the same in its performance as the law of the 19-year cycle. The lunar dates themselves follow the same law, and periodically, in harmony with the 19-year cycle principle, the extra moons are interpolated that bring the lunar year into har-

[22] Joanne Davide Michaelis, *De Mensibus Hebraeorum Commentatio*, Bremae, 1763, Sections II and III.

[23] The moondates in standard chronological tables point out the Jewish intercalary years. And in addition, the dated eclipses found in the inscriptions are an index to the first month of the year and its relation to the Julian calendar.

[24] Migne, *SL*, LXVII, 494–498.

[25] Migne, *SL*, LXVII, 953, can. 69; 959, can. 185, 186.

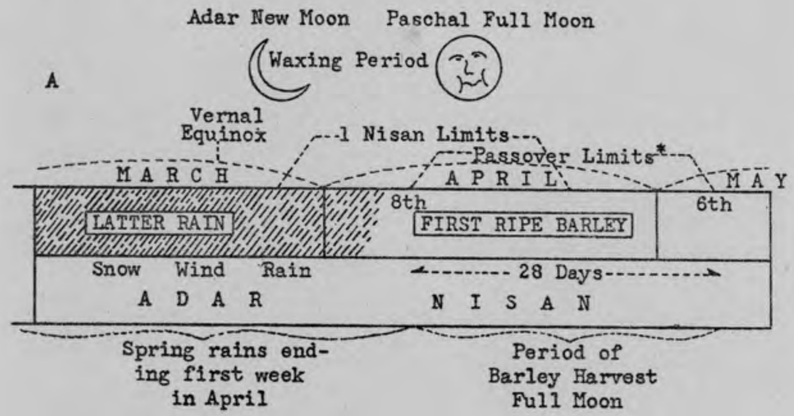
[26] Scaliger, *De Emendatione Temporum*, Francofurt, 1593, 107. According to Scaliger, the Dionysian cycle had March passovers in the years 2, 3, 4, 7, 10, 12, 13, 15, 16, 18, that is, in these years of the 19-year cycle, the passover was in Adar, and not in Nisan.

mony with the solar. Every 19 years, the barley-harvest-moon dates repeat within a day. The embolismic years follow the same cycle number indefinitely, and the cycle can be numbered from any year in the series. In TABLE I, the Veadar years are marked with an asterisk (*), and the remaining years are common (c). If these symbols be set down in order, they will run as follows:

$$\underbrace{*\ c\ c\ *\ c\ c\ *\ c\ c\ *\ c\ *\ c\ c\ *\ c\ c\ *\ c}_{\text{19 years}}$$

This order of common and Veadar years never changes in barley-harvest reckoning, and, with the ancient Jews, the embolismic month was always in the spring. The advantage of employing the barley-harvest cycle will at once be recognized when it is considered that the dated context may give some hint as to the season.[27] The following diagram outlines the ancient passover limits:

PASCHAL SEASON IN FIRST CENTURY



* Scaliger, Joseph, De Emendatione Temporum, p. 265. Francofurt, 1593.

[27] Luke 6 2=*after the passover*, for the disciples were eating the barley corn (cf. Lev 23 14); John 6 4, 10 and 17 19=*early spring*, as indicated by the

2. *Passover Following the Jewish Day of Full Moon at Jerusalem.* In ancient times, the rising of the full moon near the time of sunset, or soon after, pointed to the subsequent Jewish day as that of the passover on the 14th of Nisan. To this fact Philo Judaeus refers when he describes the day of the passover as "full, not by day only, but also by night, of the most beautiful light."[28] The question as to what moon date would mark a passover "full of light" was much discussed by early Christians. The Vatican Observatory (Astronomer J. G. Hagen) testifies that the ancient canons forbade that Easter should ever be celebrated "on the day of the astronomical full moon,"[29] possibly referring to the canons which forbade the Christians from observing Easter at the same time as the Jewish passover.[30] However, other Jewish sources, earlier than Philo, definitely maintained that "the day of the paschal festival began on the 14th of Nisan, *after* the evening, when the moon stands diametrically opposed to the sun, as any one can see at the time of full moon."[31]

The foregoing citation came originally from the pen of Aristobulus. He was an Alexandrian Jew who lived in the second century B. C., and is said to have been tutor in the court of a king of Egypt.[32] He wrote a commentary on the Pentateuch, from which his declaration concerning the passover date and its full moon relation was passed down to posterity by Anatolius and Eusebius. It has not changed its intrinsic meaning in the hands of successive interpreters, although it has been translated again and again and has been discussed by bishops and chronologers alike throughout the Christian era.

Whether the statement of Aristobulus reads "at the evening,"

plentiful green grass and the storm on the lake; Jer 36 30 = *early summer*, in harvest, before the snow had melted from off the mountain tops (cf. Prov 25 13). Scene locates the time of Jehoiakim's death.

[28] Philo, *Special Laws*, ii, 210.

[29] Hagen, J. G. [Vatican Observatory], *Catholic Encyclopedia*, art. "Lilius," New York, 1910, IX, 251.

[30] Migne, J.-P., *SL*, LVI, Concilium Laodiciae Phrygiae Pacatianae, C. XXXVII, XXXVIII, XXXIX, col. 719.

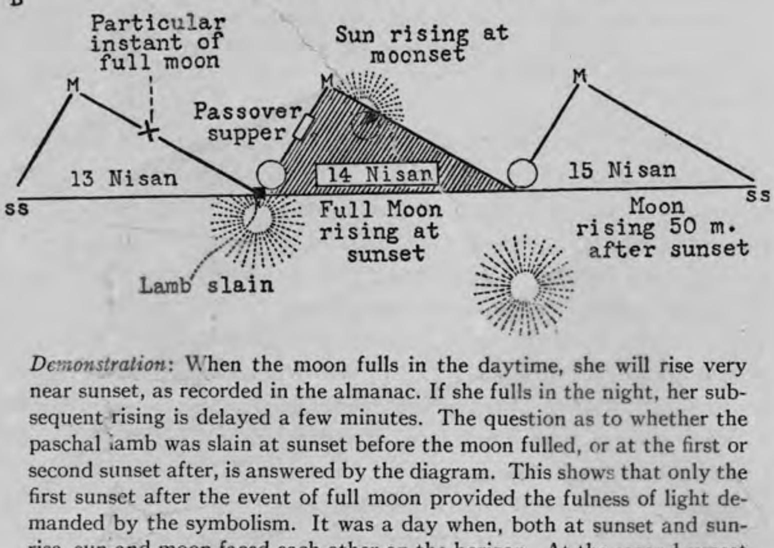
[31] Nicolai Nancelii, *Analogia Microcosmi ad Macrocosmon*, Secunda Pars, col. 1204, Paris, 1611.

[32] 2 Mac 1 10.

as in Crusè's *Eusebius*,[33] or "after the evening," as in Caspari's German rendering of the Greek original,[34] and also in Nancel's Latin translation,[35] the meaning is the same, namely, that the astronomically *full* moon must arise on the eastern horizon opposite to the setting sun before the paschal feast. This phenomenon occurs at sunset, or soon after, on the civil day of full moon, as recorded in every ordinary almanac. The following diagram B illustrates the original declaration of Theophilus regarding the passover date:

PASCHAL CELEBRATION (Theophilus)

B



Demonstration: When the moon fulls in the daytime, she will rise very near sunset, as recorded in the almanac. If she fulls in the night, her subsequent rising is delayed a few minutes. The question as to whether the paschal lamb was slain at sunset before the moon fulled, or at the first or second sunset after, is answered by the diagram. This shows that only the first sunset after the event of full moon provided the fulness of light demanded by the symbolism. It was a day when, both at sunset and sunrise, sun and moon faced each other on the horizon. At the second sunset after full moon, the moon is already waning, and does not rise for nearly an hour after the sun has sunk beneath the horizon.

This phenomenal relation between the setting sun and rising full moon is most exactly displayed on the equator. Jerusalem is so near the equator that equatorial conditions exist on that latitude. But the farther north one goes, the greater the delay of the rising full moon, until, at the north pole, the full moon does not rise at all for two weeks.

[33] Eusebius, *Ecclesiastical History*, tr. Crusè, London, 1847, 323.

[34] Charles Ed. Caspari, citing Aristobulus in *Introduction to the Life of Christ*, tr. Evans, Edinburgh, 1876, 8.

[35] Cf. note 31.

The early Christians were quick to catch the figurative significance of the paschal "light," and the question was persistently argued as to how the Christian feast could have the light demanded by the Jewish symbol, and yet not be celebrated at the same time as the Jewish passover. Ambrose of Milan reasoned that "since the lamb had to be slain at evening [*ad vesperum*], we can begin at the last hour before evening."[36] From the Alexandrian priest Theophilus, who was appointed by Theodosius to calculate the problem of the Easter calendar, comes the following significant conclusion, as cited by Cyril:

> "For so Theophilus thinks that the fourteenth of the moon is seen in the heaven when the full moon rises at the same moment in which the sun sets, and when, at the end of the same night, the sun rises with the setting moon."[37]

Thus early Christianity arrived at an exact point of time for the beginning of the passover day — one to which a precise astronomical event gave witness. These ancient views concerning the relation of the full moon to the passover are further confirmed by Catholic teaching in the 7th century A. D. The Scot heresy over Easter chronology is frequently mentioned in Christian literature. The Catholic presbyter was Wilfrid, and he corrected the Scots, who professed to celebrate the Easter feast on the 14th of the moon, and to follow the ancient plan of Anatolius of Laodicea. These Celtic churches also claimed to have originated in the East, under the leadership of the Apostle John.[38] They were therefore under the influence of Quartodeciman theories, and too far from Rome to have yielded to Nicaean rules. But the Roman church responded through Bishop Wilfrid that the passover custom of the East was different from that of the Scots, and stated exactly the rule that Anatolius taught:

> For he [Anatolius] maintained the paschal 14th to be only the day which the full moon would overtake in the evening, that is, before sunset, and would moreover be called the 13th, and not the 14th.[39]

[36] Aegidii Bucherii, *De Doctrina Temporum*, Antverpiae, 1634, 479.

[37] Id., p. 483.

[38] Alexander Ewing, *Cathedral or Abbey Church of Iona*, London, 1866, 26.

[39] Dionysii Petavii, *Animadversiones in Epiphanii Opus*, 195.

In other words, Anatolius placed the passover on the day *after* the moon had fulled, as anciently taught by the Alexandrian Jew Aristobulus, and several centuries later by Theophilus. And Presbyter Wilfrid also caught the same interpretation.

3. *A Basis for Crucifixion Calendation.* In this study, the time of the Lord's passover supper is the date to be submitted to astronomical proof, and the relation of this event to the calendar new moon will be demonstrated. The biblical account by both John and the Synoptists regarding this point of time is in agreement, namely, that the supper occurred in the evening before the crucifixion, and obviously therefore, on the same Jewish date as the death of Christ. Jesus called this supper the passover (Luke 22 15). All the Evangelists name the day as that of the "preparation"— **παρασκευή**. The word is used six times in the NT.[40] Mark defines this hellenized term as the "day before the Sabbath"— *προσάββατον* (Mark 16 42). He goes further, and plainly declares that Jesus arose "early the first day of the week" (Mark 16 9), while the two men from Emmaus succinctly state that this first day of the week was the third from the Lord's passion (Luke 24 21). Scholarship commonly accepts these facts.

Although the argument is long-standing as to whether John and the Synoptists agree about the time of the national passover, it is unnecessary to answer the question here, since the Lord's paschal supper itself presents a feast date to which the death of Christ can tie. Nevertheless, this festal date must be confirmed before it can be linked with the Julian calendar. There still exists much uncertainty whether crucifixion Friday was 14 or 15 Nisan. In answer two proofs will be given that Jesus died on 14 Nisan: (a) Luke's chronology as combined with the pentateuchal calendar; and (b) the position of the new moon in relation to the passover ceremony.

a. *Luke's Chronology.* In Acts 1 3 it is stated that, according to many infallible proofs, Jesus was seen for forty days after his passion. Resurrection Sunday was the first day of this forty-day period. But that Sunday

[40] Matt 27 62; Mark 15 42; Luke 23 54; John 19 14, 31, 42.

was also the second day of the feast of unleavened bread. The first day of this feast was called a "high day" (John 19 31), and it was also described as the "fifteenth day of the first month"— a convocation sabbath upon which no servile work could be done (Lev 23 6, 7). But not so the second day of the feast, when the people were to go into the field and cut a sheaf of ripe barley, and bring it to the priest to be waved before the altar (verse 11). This sheaf of first fruits was a symbol of Christ the risen First Fruits (1 Cor 15 20). Consequently, the offering of the symbolic barley sheaf on the second day of the feast was in perfect harmony with the resurrection Sunday.

But ancient law also commanded that Pentecost was to be counted as the fiftieth day from the day of offering the barley sheaf, while Luke reports that the fortieth day from that same Sunday marked the ascension of Christ. By first tabulating Luke's period, beginning with Sunday, and then adding ten days to complete the days of the omer, it will be seen that in the year of the crucifixion, Pentecost fell on a Sunday, the sixth of Sivan — a date that is in harmony with both the earliest and latest Jewish calendars.

Therefore this whole period of the "feast of weeks" is synchronized by the fact that Pentecost's "fifty days" and Luke's "forty days" both began from the same day of the week — Sunday of the resurrection. And this synchronism identifies crucifixion Friday as 14 Nisan.

The following calendar table confirms all these chronological details, showing clearly that Friday of the crucifixion must have been 14 Nisan, in harmony with a subsequent Pentecostal Sunday. If that Friday had been the fifteenth, it would have been the pentateuchal "first day" of the feast of unleavened bread[41]— the holy convocation sabbath upon which no servile work could be done, and upon which the Sanhedrin had specially decreed that Jesus should not be killed (Matt 26 5). Furthermore, on a "fifteenth day" of Nisan, Simon the Cyrenian would not have been returning from the "field"— **ἀγρός** — where seemingly he had been at work.

[41] It is important to take note that nowhere in the Greek text is the evening in which Christ celebrated the passover, or the day itself of the crucifixion, called the "feast of unleavened bread." It is instead named by the Synoptists as the "first day of unleavened bread" (Mark 14 12; Matt 26 17), and "the day of unleavened bread" (Luke 22 7). But these terms are in harmony with Ex 12 8 and Num 9 11, where the law commands that unleavened bread should be eaten with the paschal lamb.

Crucifixion Year (Passover to Pentecost) — Based on our Lord's passover.

"Weeks"			Nisan	
		Fri	14	— Passover = evening *ineunte.*
		Sab	15	— "Holy convocation" = 1st day of feast*— Lev 23 7.
	1	Sun	16	— "Morrow after sabbath"— Wave sheaf. Lev 23 11.
	2	M	17	— Resurrection Sunday. Christ the "first fruits."
	3	Tu	18	= Seven day's feast of unleavened bread — Lev 23 6.
1	4	W	19	
	5	T	20	
	6	F	21	— "Holy convocation" = 7th day of feast — Lev 23 8.
	7	S	22	
	8	Sun	23	
	9	M	24	*The "high day" of John 19 31. Compare Lev 23 6,7
	10	Tu	25	and Num 28 16, 17.
2	11	W	26	
	12	T	27	
	13	F	28	
	14	S	29	
	15	Sun	30	
	16	M	1	I
	17	Tu	2	Y
3	18	W	3	A
	19	T	4	R "Seven weeks shalt thou number unto thee: from the
	20	F	5	time thou beginnest to put the sickle to the standing grain
	21	S	6	shalt thou begin to number seven weeks"— Deut 16 9
	22	Sun	7	ARV.
	23	M	8	
	24	Tu	9	
4	25	W	10	"And ye shall count unto you from the morrow after the
	26	T	11	sabbath, from the day that ye brought the sheaf of the
	27	F	12	wave offering; seven sabbaths shall be complete:
	28	S	13	
	29	Sun	14	
	30	M	15	
	31	Tu	16	"Even unto the morrow after the seventh sabbath shall
5	32	W	17	ye number fifty days; and ye shall offer a new meat offer-
	33	T	18	ing unto the Lord"— Lev 23 15, 16.
	34	F	19	
	35	S	20	
	36	Sun	21	
	37	M	22	
	38	Tu	23	
6	39	W	24	

Demonstration. In Diagram C lines 1 to 4 represent 14 Nisan to be *on* the day of full moon. As a result, the translation periods run from 2.16 to 15.89 hours in length. These periods are altogether too short for visibility of the moon to occur,[43] and especially if the new moon is near apogee, as in 47 A. D. In the last line, the 14th of Nisan has been placed *before* full moon, and in consequence, the calendar phasis appears *before* conjunction! These positions for 14 Nisan are wholly inconsistent.

Hence the conclusion is self-evident that the placing of 14 Nisan on or before the full moon results in absurd calendar decisions — such as are contrary to the moon's true course in her orbit.

In every century there occur at least twenty or more Nisan phasis dates with short translation periods, approximating 1 to 1.5 days in length. In these instances the passover necessarily has to be dated after the day of full moon, or else the new moon would be made to appear on the calendar in too short a time after conjunction as demonstrated in the foregoing diagram C. Then again, the Nisan new moon periodically occurs in apogee.[44] In this position the moon is farthest from the earth, and her motion too slow to permit an earlier appearance of the phasis, as would result from making 14 Nisan coincide with the full moon. If, therefore, when the new moon is in extreme motion — either perigee or apogee — the passover cannot be dated *on* the full moon without conflicting with new moon relationships, it is equally conclusive that this calendar arrangement would conflict with the new moon when in average motion.

Accordingly, the passover *after* full moon is the only 14-Nisan position that agrees with the new moon relation to the conjunction. And in addition, if the passover date is wrong, the position of the preceding phasis is bound to be wrong. Many crucifixion arguments have entirely overlooked these relationships, and in

[43] Hevelius insists that the first appearance of the moon does not commonly happen even on the first day after conjunction: *Selenographia*, Gedani, 1647, 273. Geminus: "When the moon is in perigee and her motion quickest, she does not usually appear until the second day"— Cf. note 62. The ancient Karaites did not begin their new month unless the interval between conjunction and the subsequent sunset was over 22 hours: F. K. Ginzel, *Handbuch der mathematischen und technischen Chronologie*, Leipzig, 1911, II, 82 f.

[44] Cf. Table E.

one and the same calendar table, the passover will be dated *on*, *before*, and *after* the full moon.[45] Necessarily, therefore, each year of the hypothetical crucifixion period needs to be analyzed according to the astronomical conditions involved.

4. *The Moon's Anomaly an Important Calendar Control in the Spring.* The visibility of the moon is a function of four principal quantities. This is Schoch's definition.

a. Geographical latitude and longitude of the observer.
b. Sun's longitude — place in the zodiac belt.
c. Geocentric latitude of the moon — degrees north or south of ecliptic.
d. Moon's anomaly — angular distance between perigee, earth and moon.

In determing the visibility of the Nisan new moon on the meridian of Jerusalem, the first two of these factors can be disregarded because they are constant. The third factor also can be largely eliminated, but for another reason. In the spring of the year, to which season the crucifixion problem belongs, the sun's path is so nearly erect with the horizon at the time of setting that a great positive latitude of the moon would only slightly increase her height above the horizon. Therefore, at this time of year, the moon's latitude does not greatly affect the time of moonset and consequently the moon's visibility (Cf. Diagram M). The contrary is true in the autumn, when the setting ecliptic coasts low with the horizon. If the moon is south of the sun, "there will be a tendency toward a late phasis" (Fotheringham); or "a negative latitude of −5 degrees raises the necessary age of the *neulicht* to about 41 hours" (Schoch).[46]

[45] Martin Sprengling, "Chronological Notes from the Aramaic Papyri. The Jewish Calendar," *The American Journal of Semitic Languages and Literatures*, 1911, 252. [In Nos. 1, 6, 15, 21, 25, 26, 27, and 30, of this table, the phasis occurs before conjunction!]

Olmstead, A. T., "The Chronology of Jesus' Life," *Anglican Theological Review*, 1942, 4. [In this table, the passover is *before* full moon in 31 and 33; *on* full moon in 30, 32, and 34; and *after* full moon in 29, 35, and 36.]

[46] Karl Schoch, "The Crucifixion of Christ on the 14th of Nisan," *Biblica*, IX (1928).

The moon's waxing period is therefore an indication of the proportionate length of the translation period. That is, when the waxing period is long or short, the translation period must correspondingly be long or short. The waxing period is also an index to the anomaly of the moon and her distance from the earth, and hence it is also a pointer to the moon's first appearance after conjunction — a phenomenon that depends upon the length of the translation period. The value of this relationship to calendation is great. For in early centuries, the position of even the mean perigee and apogee is determined only by many figures, while in a modern standard almanac, the anomaly of the moon is given with every month's record. On the contrary, the waxing period is a simple computation easily reckoned for any course of the moon in ancient times. And when, for example, the Ginzel tables leave off, Schram's tables are available for calculating the moon's phases for any month in any year.[48] These lunar tables in the hands of the student of chronology are an indispensable means to chronological research — one acceptable to standard almanacs, and one independent of any proposed calendar practice not based upon known astronomical values.

The lunar calendar must respond to these astronomical ratios which the moon marks off on her orbit under the influence of earth and sun. The following *demonstration* makes this clear:

Demonstration: Column 8, Table I, shows the progression of the Nisan waxing period from year to year. This waxing period runs in 9-year epochs, as indicated by the brace from 1 to 9 A. D.[49] The fastest waxing period is 13.91 days; the slowest is 15.53 days. Distance traveled = about 180 degrees. The increase and decrease of the annual lunar advance, per fraction of a day, is as follows: .28, .30, .69, .35, .04, .43, .69, .29. In other words, the difference is always less than one day.

Conclusion: Since the moon, in going half-way around her orbit during the paschal season, from year to year, always increases and decreases her rate of travel by less than a day, therefore her annual increase and decrease from one translation period to another in this same season, must similarly *be less than one day*.

[48] F. K. Ginzel, *Handbuch der mathematischen und technischen Chronologie*, Leipzig, 1911. Robert Schram, *Kalendariographische und chronologische Tafeln*, Leipzig, 1908.

[49] In every seven epochs, there will be one that consists of 8 years only.

If the moon's annual difference in velocity at the end of 180 degrees of travel is less than a day, the difference obviously could not be more at the end of the much shorter translation periods. And if the calendar should fail to respond to this rate of difference and should advance the Nisan phasis more than a day forward from the previous Nisan phasis, then the calendar would be out of agreement with the motion of the moon.

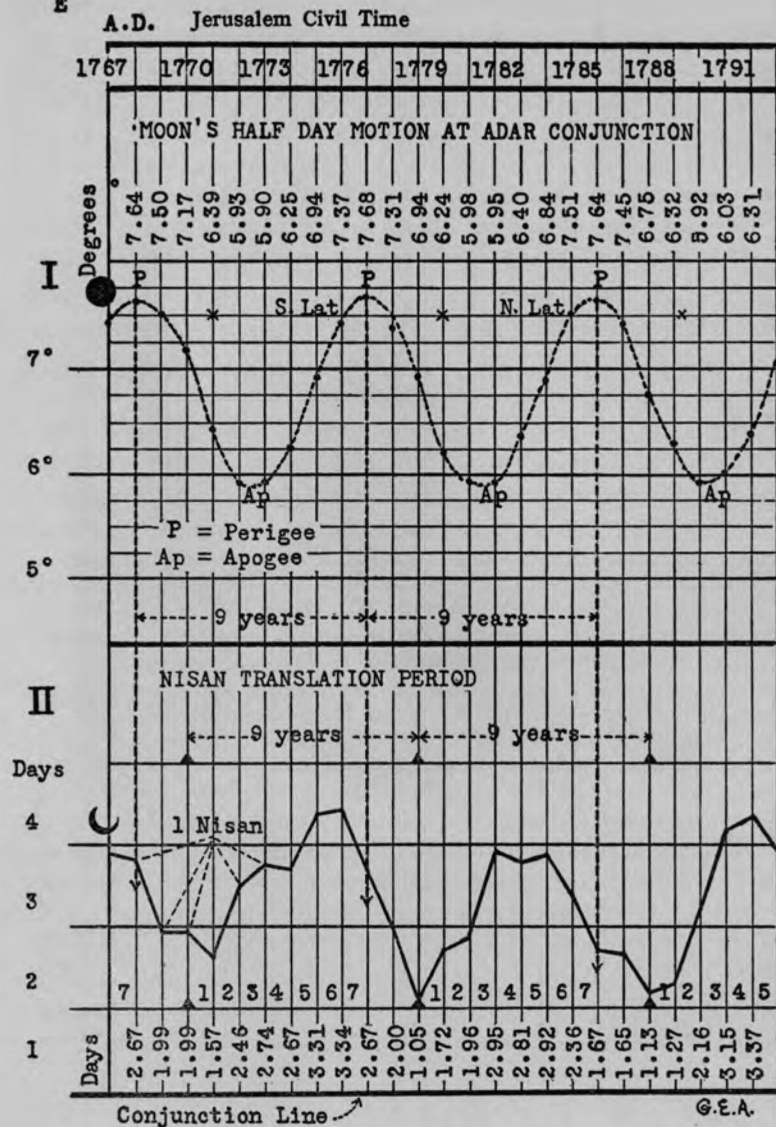
Still further evidence of the importance of the moon's anomaly and its relation to ancient calendation is demonstrated in Table E. In this table the anomaly is shown to be tied in a very direct way to the Jewish passover. And in this connection let us be reminded that in ancient times, just as in modern observation, experienced star-gazers could tell by watching the moon's position for a night or two, whether she was tending toward the earth, or away from it.

Demonstration: (Table E) In Graph I of this table, the 12-hour velocity of the moon at the time of the Adar conjunction,[50] is projected, and this series is computed from the ample figures of the British Nautical Almanac. In Graph II, the Nisan phasis, at the end of each translation period, is projected, and this series is based upon the calendar rules adopted in this research, the chief one of which is the Jewish passover relation to the full moon. The lunar rhythm between these two graphs is definitely established. At the peak of each velocity wave in Graph I stands the Nisan conjunction on perigee; and, in Graph II, this astronomical event is acknowledged by the 7th year of each phasis wave. (In every 62 years, there will be a coalition in the 6th year of some wave.)

Graphs I and II have been outlined through the whole period of existence of modern standard almanacs, and they are a witness to the validity of the passover-full moon relation and its efficiency in establishing the ancient Jewish calendar. These graphs demonstrate that the form of luni-solar calendation based equally upon pentateuchal law, the crucifixion narrative, and ancient historic evidence, is also in harmony with the astronomical laws governing the moon's motion, of which the lunar anomaly is the most important in the spring of the year.

[50] Referring to the conjunction preceding the first of Nisan.

E



The position of the conjunction is represented as if in a straight line for the sake of comparison only.

5. *Translation Period a Variable "1 to 4" days after Conjunction.* Aratus and Pliny are among the first to mention the moon's translation period, which is also called the *interlunium*, signifying "between moons." Some call it the "change of the moon." The following is Pliny's description:

> When the moon has ceased to be visible, she is in conjunction, a period known to us as *interlunium*. During the conjunction, the moon will be above the horizon the same time as the sun for the whole of the first day.[51]

Pliny also hints at the length of the translation period:

> Where the soil is humid, put in seed at the moon's conjunction, and during the four days about that period.[52]

As further reference to the limits of the translation period may be mentioned Geminus, Achilles Tatius, Kepler, Hevelius, Würm, Ideler, William Hales, and Fotheringham, who are in agreement with Pliny that the translation period may go to the third day after the day of conjunction. These are their statements:

1. Aratus, 3rd century B. C.—

> Scan first the horns on either side the moon. For with varying hue from time to time the evening paints her, and of different shape are her horns from time to time as the Moon is waxing — one form on the third day, and other on the fourth. From them thou canst learn touching the month that is begun.[53]

2. Geminus, 1st century B. C.—

> For when the moon is fastest, she appears as a sickle on the day itself of conjunction; when slowest, on the third day, and remains a sickle sometimes even to the fifth day.[54]

[51] Pliny, Natural History, tr. Bostock and Riley, London, 1855, IV, 112.
[52] *Ibid.*, 111, 112.
[53] Aratus, *Phaenomena*, tr. Mair, London, 1921, 441.
[54] Geminus, "Isagogue *re* Phaenomena of Aratus," *Uranologion*, Paris, 1630, 40. [Other authorities — Pliny, Hevelius, Scaliger — maintain that the moon very rarely appears on the day of conjunction.]

3. Pliny, 1st century A. D.—

Then she lingers two days in conjunction with the sun, and after the 30th day at latest sets out again on the same course — being perhaps our teacher as to all the facts that it has been possible to observe in the heavens.[55]

4. Achilles Tatius, 6th century A. D.—

But the nativity of the moon treats from its birth. Indeed, three or four days after birth she appears, and not at the same time she was born. When she arises, she does not have a full orb of light, but is sickle-shaped.[56]

5. Kepler, Joannes, 16th century —

The months of the primitive Latins did not begin from the very conjunction itself, which could not be seen, but from the first evening rise of the moon, which the Greeks call the *φάσιν* because the moon then begins to appear — *φαίνεσθαι* — on the third day, or the second day, sometimes on the fourth day, after conjunction, often also on the same day.[57] The priests therefore first called their words after the moon had been seen in the evening: "I call the new consecration," that is, "I proclaim the new moon."[58]

6. Hevelius, Johannes, 17th century —

But that the first rising of the moon does not generally happen on the first day after conjunction, but at length on the second, often also on the third and fourth — is plain to all observing her.[59]

But if the causes already related that advance the quick rising of the moon do not always conspire together, but only one is lacking, then on the following day after conjunction, this first phasis at length presents itself: but if two requisites are lacking, it can happen that at last on the third day, the first appearance of the moon falls in sight. But with all three conditions lacking for accelerating the rise of the moon, then finally on the fourth day after conjunction with the sun, this first vision of the moon takes place.[60]

[55] Pliny, Natural History, II, tr. Rackham, London, 1938, 195, 197.
[56] Achilles Tatius, "Isagogue," *Uranologion*, 141.
[57] Few would agree with this statement.
[58] Joannes Kepler, *Opera Omnia*, Francofurt, 1870, VIII, 269.
[59] Johannes Hevelius, *Selenographia*, Gedani, 1647, 274.
[60] *Ibid.*, 275.

7. Würm, 18th century, as cited by Caspari —

> Würm, finally, expresses his opinion that we should not go far wrong if, in order to find the first day of the month, according to the old Jewish style, by the moon's phase, we add 24 to 48 hours to the true new moon astronomically calculated; and on page 279 he lays down the rule that we have on the average to add 1 and ½ days. This principle has been accepted and carried out by Ideler, Wieseler, and most chronologers.[61]

8. Hales, William, Chronologer, 19th century, citing Geminus

> And this is confirmed by the Grecian astronomer Geminus, who states, "that when the moon is in *perigee*, and her motion quickest, she does not *usually* appear until the second day, nor in *apogee*, when slowest, until the fourth. The exception in the former case intimating that she might sometimes be seen on the first day."[62]

9. Fotheringham, J. K., Astronomer, 20th century, citing Hevelius —

> I have fallen back on Hevelius's rules, which are the result of his own observations in Poland (Gedanum), and may be seen in his *Selenographia*, p. 273 and following. He found that if all these circumstances were favourable, the moon, if new in the morning, would be visible in fine weather the same evening. If two circumstances only were favourable, the phasis would be delayed one day, and if one only were favourable, it would be delayed two days; if all three were unfavourable, it would be delayed three days; always presupposing fine weather.[63]

We have, therefore, uniform consent from earliest time — one astronomer after another agreeing with those who have gone before — that the moon's translation period can at times be three or four days in length. The calendar argument here under discussion is in full agreement with these authorities. In any of the translation cycles presented, the Nisan translation period runs to the third day after conjunction day at fairly regular intervals. In so doing, the passover reckoning is in harmony with both ancient and modern testimony, and with the astronomical principles governing the moon.

[61] Ch. Ed. Caspari, *Introduction to the Life of Christ*, tr. Evans, 1876, 15.
[62] William Hales, *New Analysis of Chronology*, London, 1830, I, 67.
[63] J. K. Fotheringham, *Journal of Philology*, XXIX (1903), 106.

6. *Ancient Jewish Phasis Commonly the "Second" or "Horned" Moon.* Hevelius thus defines the *second* or *horned* moon:

> But we call the horned moon that phasis, which to some of the ancients is the second moon, for the reason that on the second day after conjunction of all luminaries she is earliest seen, and follows the first moon. But, because she cannot always be seen on the second day, all the causes can hinder which do not allow the first moon to be seen on the first day after conjunction. But the especially hindering cause is when she is turned about in the signs of short setting, of which kind are Cancer, Leo, Virgo, Libra, Scorpio, and Sagittary. [Signs of short and long setting explained above]. For although the moon may be in perigee, and around the northern border, yet, if she is not advancing in a sign of long setting, in vain may the horned moon be expected on the second day.[64]

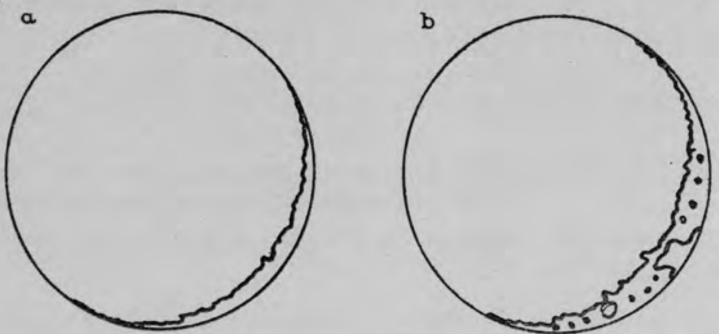
And thus, according to astronomy, it is in the spring, in Aries or Taurus — signs of long setting — that the horned moon is best seen, and hence at the beginning of the paschal month when the Jewish new year started. The question of young or old moons in starting the Jewish year is a vital problem pertaining to the ancient dates. For if, in ancient times, any young crescent that appeared on the evening horizon soon after conjunction, in any season of the year, and on any meridian, was taken as a point of time from which to regulate the year, great confusion would have resulted. Consequently, so far as observation was concerned, it was imperative that the ancient Jewish computation be regulated from one place only — Jerusalem — and from a season of the year in which the young moons could be best seen — the spring, not autumn. It was at Jerusalem that the Calendar Senate was formed — not Babylon! And that such an astronomical court was ever conducted by the Jewish people,[65] is abundant proof of their early skill and experience in astronomy and calendar science. But to return to the horned moon.

Hevelius gives a description of the first and second moons as taken from actual observation:

[64] Johannes Hevelius, *Selenographia*, Gedani, 1647, 28.

[65] Maimonides, De Sacrificiis Liber, tr. Compiegne de Veil, London, 1683, cap. 2.

F



a. *First Moon.* Observed at Gedanum — 13° in Taurus, south latitude, perigee. First day after conjunction. 1644 A. D., Apr. 8, 8 p. m.

b. *Second Moon.* Observed at Gedanum — 14° in Aries, south latitude, apogee. Second day after conjunction. 1645 A. D., Feb. 28, 7 p. m. Julian time. (Hevelius, *Selenographia*)

First Moon: In the first phasis, there was indeed detected great sharpness, as in the illuminated part, so also in the section of shade, although not yet may there be seen any known lake, mountains or seas, since the light part is very slender, especially in the neighborhood beyond the limb of the moon.

Second Moon: But in this later observance of the second moon, already some known mountains were seen projecting a sufficiently black shadow into the valleys on the western side of the mountains.[66]

Scaliger repeatedly insists that the ancient Jews commonly employed the horned moon in starting their year, although he also states that, from time to time, they began the month with the young crescent. Others agree with him on this point of calendation, and the following is his statement so frequently cited:

But the Jewish, Arabic and Samaritan new moons commonly exceed the size of the phasis; so that the civil new moons of the lunar months are of three kinds: the Attic, from the conjunction (a), the Calippic, from the waxing moon (b), and the Jewish, Samaritan and Arabic, from the form of the moon on the third day (c), let me say.[67]

[66] Hevelius, *Selenographia*, 283.

[67] Scaliger, *De Emendatione Temporum*, Francofurt, 1593, 6.

In this Scaliger citation, the signs of omission represent three Greek phrases describing the moon's phasis:

(a) ἀπὸ τῆς σηνόδου=*from the conjunction* (Attic).
(b) ἀπὸ τῆς ἀποκρούσεως=*from the waxing moon* — young moon (Calippic).
(c) ἀπὸ τοῦ μηνοειδὲς σχήματος=*from the shape of the moon* — the moon with defined horns (Jewish).

Godwyn thus comments upon these technical descriptions of the phasis:

> In the first it was *quite dark*; in the second *it did open itself to receive the Ṣun-beams*; in the last it did appear *corniculata, horned*."[68]

It is therefore self-evident that the ancient Jewish phasis was different from that of other lunar calendars, some of which, like the Athenian, depended upon calculation, and others, like the Calippic and Babylonian, seem to have employed observation alone. But when the new moon was near perigee, and her motion accelerated, all the various moon calendars might have lunar dates in common. On the contrary, when the moon was near apogee, and required three or four days in which to make a first appearance, that is, the second moon, the Jewish new year would tend to occur later than any other, because (1) it started from an older shape of the crescent, and (2) because at this time, the translation period would be deferred to the third day after the day of conjunction.

The ancient Jews were expert calculators and skilled observers of the moon as well; but their calendar had also to be tied to the passover and its new and full moon relationships. This indispensable combination was accomplished by the astronomical relation between the waxing period and the translation period. For if the Nisan waxing period were long — over 15 days, for example — then the calendar phasis must be at least two days, and frequently three days old, as the translation figures will indicate. The moon's motion demands this relation. And it certainly would be inconsistent in such a case to place a young Nisan phasis on the calendar — one less than a day old!

[68] Thomas Godwyn, *Moses and Aaron — Rites*, London, 1685, 122.

Other essential calendar rules with reference to the position of the phasis are the following:

(a) Average annual advance of Nisan phasis — less than a day. Discussed under III.

(b) By actual observation, it is a rare astronomical event for the moon to appear on the civil day itself of conjunction.[69] Hence the lunar calendar must respect this fact.

(c) The calendar position of the phasis must not distort the natural length of the ancient year — as 354 or 355 days for a common year, and 383 or 384 days for an embolismic year (Cf. Table III).

(d) The Tishri new year is the 177th day after the Nisan new year (Cf. Table IV).

(e) Laws governing barley-harvest intercalation:

Geminus: That in no luni-solar calendar can there be two consecutive embolismic years, or three consecutive common years.[70]

Reinach: That the embolismic year date is reproduced at periodic intervals that are a multiple of the cycle.[71] Barley-harvest cycle number is 19.

All of the discussion thus far has pertained to the laws that govern ancient Jewish time. Nevertheless, in the main, they comprise but two basic principles: (1) that the ancient passover full moon was the first full moon in the season of new fruits, or ripe barley; and (2) that the passover sacrifice on 14 Nisan was the next day after the Jewish day of full moon in Jerusalem. It is a simple matter to run down an almanac page of full moons, and select each true paschal full moon date. All March full moons should be rejected, and those of the first week in April, up to April 6 or 7 for the first century. Scaliger counted April 8 as the earliest passover in the time of the Messiah,[72] and Schiaparelli has about the same limits.[73]

[69] Pliny, Natural History, tr. Bostock and Riley, London, 1855, I, 49. Bucherius, *De Doctrina Temporum*, Antverpiae, 1634, 372.

[70] Gemini, *Elementa Astronomiae*, tr. Manitius, Leipzig, 1898, cap. VI.

[71] Théodore Reinach, "The Calendar of the Greeks of Babylonia," *Revue des Études Juives*, XVIII (1889), 90–94.

[72] Scaliger, *De Emendatione Temporum*, Francofurt, 1593, 265.

[73] G. V. Schiaparelli, *Astronomy in the Old Testament*, Oxford, 1905, 122.

In Graph II of this diagram not one of the afore-stated relations exists. The majority of the passover dates on 14 Nisan begin before the moon fulls, as in the years 30 to 34 included in the brace. These years, as they stand in Graph II, have no corresponding relation between the translation and waxing periods. Two outstanding irregularities are year 31, with a long waxing period of 15.36 days, and a very short translation period of only 1.19 days; and the year 33, with a still longer waxing period of 15.39 days, and a still shorter translation period of less than a day —.87 day! Both instances represent absurd calendar practice. In not one of the years, 31, 32, or 33, where the waxing period is tending toward the extreme limit, and for this reason must represent the moon passing through apogee, is it consistent to allow the shortest possible translation period, as .87 day.

And neither is the conclusion valid that Graph II represents an "observed" new moon in ancient times. For, in the year 33 for example, a passover on May 2 would place the calendar phasis within only 21 hours after the conjunction — April 17.90, J.C.T., when the moon was not far from apogee, and hence in very slow motion (mean apogee=April 14.27 — Brown). Therefore the place of the Nisan new moon in this year should demand a much longer translation period.

Graph II thus demonstrates that its lunar dates not only effect divergent relations with adjacent years, but it reveals existing contradictions to astronomical law, and therefore its dates have outlined a curve independent of ancient Jewish law and practice. It is therefore obvious that April 7, 30 A. D., as a representative Friday-passover date on 14 Nisan, would have to belong to a sporadic calendar — one that conflicts with lunar motion, and consistent calendar principles.

The following is an argument from the ancient Jewish calendar itself against 30 A. D. as the crucifixion year:

Demonstration (Cf. John 7–9). If the year 30 A. D. had been the crucifixion year, then the year 29 A. D. would have been pre-crucifixion, and its moons would have governed the events recorded in connection with the feast of tabernacles in John 7–9, which are as follows:

Day 1 — Last day of feast (John 7 37). Charmed officers listen to end of Jesus' teaching, report after day is over.

Day 2 — Sanhedrin meets, with Nicodemus present (v. 50).[75] Possibly an all-day session. All leave at night.

Day 3 — Jesus returns to temple in the morning to teach. Trial of immoral woman.[76]

Day 4 — Treasury and court scenes in John 8. Word πάλιν (verses 12, 21) indicates change of scene.[77]

Day 5 — Healing of blind man on Jewish Sabbath (John 9 14).

From the foregoing outline it is clear that several days must have intervened between the last day of the feast and the Sabbath mentioned in John 9 — at least two days, and probably three. The critical attitude of Nicodemus against the Sanhedrin made it possible for Jesus to return to the temple. The pre-crucifixion calendar year must conform to this extended period of teaching. Let us examine two consecutive years. The following calendar dates for the years 29 and 30 A. D. have been taken from Table I:

29 A. D.	30 A. D.
1 Nisan = Tuesday (Table I)	1 Nisan = Sunday (Table I)
22 Tishri = Thursday (Table IV)	22 Tishri = Tuesday (Table IV)
Only *one* day between last day of feast on 22 Tishri and subsequent Sabbath.	*Three* days between last day of feast on 22 Tishri and subsequent Sabbath.

The year 29 A. D., therefore, fails entirely to provide enough time for the events in John 7 37 to 8 59, which obviously could not be crowded into one day only. But the year 30 A. D., with a three-day interval between the last day of the feast and the subsequent Sabbath, in whatever way the incidents are tabulated, does provide ample time for the series of events as recorded

[75] The ancient Sanhedrin held no sessions on feast days (cf. Mat 26 5); it could not begin at night, nor on the first day condemn for guilt.— Alfred Edersheim, *Life and Times of Jesus the Messiah*, London, 1923, II, 555, 557. Talmudic references are included there.

[76] Some texts omit this incident in this connection; nevertheless, its validity is acknowledged, though its chronology is not. The episode is found in this connection in ancient Latin texts (*International Critical Commentary* on John 8), but it is not essential to the fact of Jesus' morning return to the temple.

[77] Edersheim, II, 164, n. 2. The chronology in John 8 represents more than one day — Cf. Gottfried Christian Friedrich Lücke, *Commentar über das Evangelium des Johannes*, 3rd ed., Bonn, 1840, II, 279–281.

in the context.[78] Consequently, the year 30 A. D. thereby identifies itself as the pre-crucifixion year.

The year 30 A. D. represents a 1 Nisan date over which astronomers of repute have disagreed. Schoch finally concluded that "visibility on March 23 is completely out of the question" (cf. Diagram G), and thought that P. V. Neugebauer, who had favored this date, had quite overlooked the very negative latitude of the moon, and the moon in her apogee.[79] Earlier, Schoch had accepted Neugebauer's view that March 23 coincided with the moon's phasis, but when his statement appeared in print, Fotheringham wrote Schoch that he must be in error — that according to his own reckoning, the moon was not visible on March 23 in 30 A. D. Schoch then admitted a "gross, unpardonable mistake in addition" and chose March 24 as the date for the moon's visibility.[80]

But 25 years previous, on the basis of Oppolzer's *Syzygientafeln* which are grounded upon Newton's law of gravitation, and by the rules of Hevelius, Fotheringham had calculated the March phasis in 30 A. D. to be on March 25 at sunset, thus calendar-dating 1 Nisan as March 26, and the 14th of Nisan as Saturday, April 8.[81] That Fotheringham is correct can be concluded from the following facts:

1. March new moon approaching apogee — therefore in slow motion, and demanding a translation period at least over two days.
2. Moon south of the sun — latitude very negative, and hence visibility difficult. According to Brown's reckoning the moon's latitude at sunset of March 25 was $-3^\circ\ 3'$.
3. Moon's anomaly large — 164 degrees — agreeing with region of apogee.
4. Moon's ascending node — 71 degrees — variation in moonrise and moonset increasing, due to declination (Fotheringham)

These figures represent the March new moon for the year 30 A. D. in a most unfavorable position for visibility, and therefore,

[78] Edersheim maintains that the *last day* of the feast was the seventh of Tabernacles, and he inserts the octave. But the Sanhedrin would not meet on this day either, all of which only defers the subsequent Sabbath.

[79] Karl Schoch, "The Crucifixion of Christ on 14 Nisan," *Biblica*, IX (1928).

[80] Ibid.

[81] J. K. Fotheringham, op. cit.

on the calendar, the translation period should be given as much time as the moon's limits will allow. Obviously, 2.92 days are the limit, thus placing the 14-Nisan passover on Saturday, April 8.

V. Calendar Demonstration of the Crucifixion Date

Every chronological conclusion with reference to ancient Jewish time demands checking with ancient Jewish law, and the calendar principles upon which it was grounded. Only upon such a basis can correct calendar decisions relating to ancient Jewish history be drawn. Therefore, the conclusions upon which the true crucifixion date rests have to do not only with the rejection of the years which fail in qualifying to mark the death tragedy of Christ, but the deciding factors must also demonstrate that the death date itself meets the specifications of the Bible narrative, and of Jewish and calendar law. In harmony with the principles set forth in this study, the following data are chosen as a critical basis of decision upon which to compute the Julian date marking the death of Jesus:

1. Jesus died on Friday, 14 Nisan — the next day after the Jewish day of full moon.
2. The crucifixion passover was late April season — that year containing a Veadar spring.
3. Hence the passover of the pre-crucifixion year must have been early season — early April.
4. In the pre-crucifixion year, 1 Nisan must have been early in the week — probably Sunday.
5. In the year of the crucifixion, Pentecost was on Sunday.

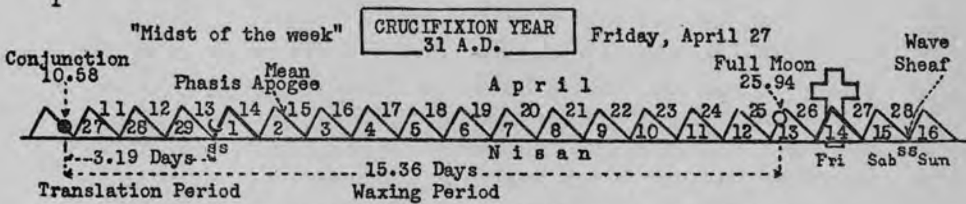
Thus there are three Jewish dates simultaneously pointing at the cross of Christ — the death Friday on 14 Nisan, Pentacostal Sunday of the same year, and a Nisan new year on Sunday in the previous year.

1. *The Death Friday After Full Moon.* Various claims for certain years of the hypothetical crucifixion period have been set forth on the one basis that by placing 14 Nisan *on* the day of full moon, it thereby coincided with Friday, and was consequently the crucifixion date. Such arguments have been made for the years 30 and 33, as has been shown. But the year 33 falls out any way, because its full moon date on April 3 is too early for

passover barley around Jerusalem, and hence the May full moon has to be taken as the paschal season (cf. Diagram H). The 19-year cycle also points to the year 33 as having the Veadar leap month (cf. Table I). In the year 30, the March new moon is advancing too slow — its waxing period over 15 days — to appear in less than two days after conjunction. Therefore this year falls down because a 14-Nisan passover *on* the day of full moon does not agree with a new moon in apogee.

The following Diagram I shows the result of placing a 14-Nisan passover in 31 A. D. on the day *after* full moon:

I



Demonstration. In the year 31 A. D., the Nisan waxing period is long — more so than in the year 30. And the new moon is again near apogee. These figures therefore demand, the same as in 30 A. D., that the April translation period be as long as the moon's limits will allow. This is fully accomplished by the after-full-moon passover, thus giving the new moon 3.19 days in which to appear. And by this arrangement, the calendar represents harmony between both new moon and full moon in the year 31 A. D. (Cf. Table K.)

Thus the crucifixion passover date in Julian time was Friday, April 27, 31 A. D.

2. *Passover Season Late in the Crucifixion Year.* If a passover, or any feast, were unusually late for its season, or early, it is consistent to expect some indication in the Bible pointing out the presence or not of the embolismic month Veadar. There are at least three lines of evidence that the crucifixion passover was late season: (a) The state of vegetation at the time of the Lord's death; (b) the ending fishing season; and (c) the beginning of the annual earthquake period in Syria.

a. *The State of Vegetation.* During passion week it was said that the "time of figs was not yet" in the highlands about Jerusalem (Mark 11 13). And still, there was in this particular orchard an isolated tree in full leaf, but without any figs. And in other orchards also, other kinds of trees were

putting forth their leaves (Luke 21 29, 30). In early April, the fig trees in Palestine, around Jerusalem, have little green figs only — no leaves. If the crucifixion passover had been in early April, none of the trees would have been in leaf. Hence the fig tree with such abundant foliage, and the leafing out of other trees also, are witnesses to the lateness of the death passover of Christ. Furthermore, Jesus himself said, "Summer is now nigh at hand" (Luke 21 30).

b. *The Closed Fishing Season.* There is uniform testimony that the Galilean fishing season is from mid-December or January to April.[82] In the very early spring before the crucifixion, Peter could readily hook up a fish off the shore of Galilee (Mat 17 27), "where the shallows swarm with small fishfry." In the second week after the crucifixion, Peter and his comrades caught nothing after an all night attempt on the lake. Then came the early morning catch at the command of the Master.

If the crucifixion had occurred early in April, as would necessarily have been the case in 30 A. D., then fishing would still have been good for a few weeks. But the fact that it was not good in water that in season teems with large fish a few yards out from shore, is an indication that the passover was late, that is, that the fishing period was coming to its end. Hence the occurrence of the miracle.

c. *The Crucifixion Earthquakes.* The biblical earthquakes outline a period from the end of the paschal season to the middle of summer, or not long after. At the dividing of the Red Sea, and of the Jordan river, the mountains "trembled" (Hab 2 10); at the giving of the law at Sinai, the "earth shook" (Ps 68 8); the fall of Jericho, Jonathan's victory at Michmash, the presumption of Uzziah, Paul and Silas in stocks at Philippi — these are other incidents accompanied by earthquake. It can be shown that all of these were after-passover or summer events. And to this series belong the two crucifixion earthquakes — one at the death of Christ, and the other at the resurrection. They obviously mark an early beginning for the earthquake season in that year, and are witness to the lateness of the crucifixion passover.

And thus, the leaves were out, the fishing season was about over, and the annual earthquakes had begun when Jesus died. The year 31 A. D., with its Nisan full moon on April 25, agrees with this evidence for a late passover. But the year 30 A. D., with a paschal full moon on April 6, points to the earliest possible paschal season in first century times — one to which the crucifixion passover could not belong. And furthermore, the 19-year

[82] P. Franz Dunkel, "Die Fischerei am See Gennesareth," *Biblica*, V (1924), 381; E. W. Gurney Masterman, *Studies in Galilee*, Chicago, 1901, 38; Reinhold Rohricht, "Regesta Regni Hierosolymitani," *Libraria Academica Wagneriana*, 1893, 38.

cycle points to the spring of 31 A. D. as embolismic, while it ascribes a common year to 30 A. D. For only by intercalation could the passover become late.

3. *Passover of the Pre-crucifixion Year — Earliest April.* Since, as has been shown from the Bible, the crucifixion spring must have included the Jewish leap month, it is impossible that the year preceding that of the crucifixion should have been otherwise than a common year. For two consecutive leap-years would be prohibitive (cf. Geminus law under 6–e), and most unlikely at any time during the operative period of the ancient astronomical Council. And in addition, a leap month at the end of a year necessarily involves a very early Nisan at the beginning of the year. This can easily be demonstrated by examining the full moons for common and embolismic years in Tables I and II.

Accordingly, only a year with a very early passover can fit the year previous to that of the crucifixion. And, from the "crucifixion period" outlined in Table I, it can plainly be seen that one year only answers to this qualification — the year 30 A. D., with a paschal full moon on April 6, and a 14 Nisan on April 8. For a period of 17 years, it is the only really early paschal date. Therefore, as a pre-crucifixion passover, April 8 in the year 30 A. D. is a very definite witness to the death of Christ.

4. *In Pre-crucifixion Year — 1 Nisan on Sunday.* From the Jewish calendar argument relating to the feast of tabernacles in John 7, it has been shown that necessarily two and probably three days spanned the interval between the last day of the feast and the following Sabbath. On the basis of a three-day interval, which seems the most likely, since it lines up with the subsequent 14-Nisan death Friday, the 22nd of Tishri in the autumn preceding the crucifixion would have to occur on Tuesday. Hence the first day of the previous Nisan would coincide with Sunday (cf. Table IV). Consequently, the year 30 A. D., with its passover on Saturday, April 8, and hence 1 Nisan on Sunday, fully answers to the calendar specifications in John 7 to 9. Therefore, the feast of tabernacles in John 7, and the healing of the blind man on the subsequent Jewish Sabbath are incidents that lock in place the pre-crucifixion year 30 A. D.[83]

[83] Those who insist that passover in 30 A. D. was on full moon Friday, April 7, make the interval too long between John 7 37 and John 9 1.

JOHN'S CHRONOLOGY

				Pre-crucifixion Year (Autumn)				Crucifixion Year
	Tishri*	Hesvan	Kisleu	Tebet	Shebat	Adar	Veadar	Nisan
	1 Tu	1 T	1 F	1 Su	1 M	1 W	1 F	1 S
	2	2 F	2 S	2 M	2 Tu	2 T	2 S	2 Su
	3	3 S	3 Su	3 Tu	3 W	3 F	3 Su	3 M
	4	4 Su	4 M	4 W	4 T	4 S	4 M	4 Tu
	5	5 M	5 Tu	5 T	5 F	5 Su	5 Tu	5 W
	6	6 Tu	6 W	6 F	6 S	6 M	6 W	6 T
	7	7 W	7 T	7 S	7 Su	7 Tu	7 T	7 F
	8 Tu	8 T	8 F	8 Su	8 M	8 W	8 F	8 S
	9	9 F	9 S	9 M	9 Tu	9 T	9 S	9 Su
	10	10 S	10 Su	10 Tu	10 W	10 F	10 Su	10 M
	11	11 Su	11 M	11 W	11 T	11 S	11 M	11 T
	12	12 M	12 Tu	12 T	12 F	12 Su	12 Tu	12 W
	13	13 Tu	13 W	13 F	13 S	13 M	13 W	13 T
	14	14 W	14 T	14 S	14 Su	14 Tu	14 T	14 Friday
Feast—	15 Tu	15 T	15 F	15 Su	15 M	15 W	15 F	15
begins	16	16 F	16 S	16 M	16 Tu	16 T	16 S	16
	17	17 S	17 Su	17 Tu	17 W	17 F	17 Su	17
	18	18 Su	18 M	18 W	18 T	18 S	18 M	18
	19	19 M	19 Tu	19 T	19 F	19 Su	19 Tu	19
	20	20 Tu	20 W	20 F	20 S	20 M	20 W	20
	21	21 W	21 T	21 S	21 Su	21 Tu	21 T	21
Last Day—	22 Tu	22 T	22 F	22 Su	22 M	22 W	22 F	22
Council—	23 W	23 F	23 S	23 M	23 Tu	23 T	23 S	23
John 8—	24 T	24 S	24 Su	24 Tu	24 W	24 F	24 Su	24
	25 F	25 Su	25 M	25 W	25 T	25 S	25 M	25
Blind man—	26 Sab	26 M	26 Tu	26 T	26 F	26 Su	26 Tu	26
healed	27 Su	27 Tu	27 W	27 F	27 S	27 M	27 W	27
	28 M	28 W	28 T	28 S	28 Su	28 Tu	28 T	28
	29 Tu	29 T	29 F	29 Su	29 M	29 W	28 F	29
	30 W		30 S		30 Tu	30 T		30

The chronology of John that points forward to Friday of the crucifixion as 14 Nisan, also designates the Julian date of the year previous to the death of Christ. The argument is as follows:

Since Tishri must have begun on Tuesday in the pre-crucifixion year, on account of the Sabbath healing of the blind man on the fourth day after the end of the feast, (John 7–9), it is obvious that in this same year Nisan must have begun on Sunday. (For the Nisan new year always comes two days earlier in the week than the Tishri new year.) But the year 30 A. D. is the only year in the crucifixion period that could possibly begin on Sunday, for in all the other proposed years, such as 28, 29, 31, or 32, the pre-Nisan conjunctions occur on week days that would not agree with a Sunday New Year. Obviously therefore, 30 A. D. must have been the year preceding that of the crucifixion.

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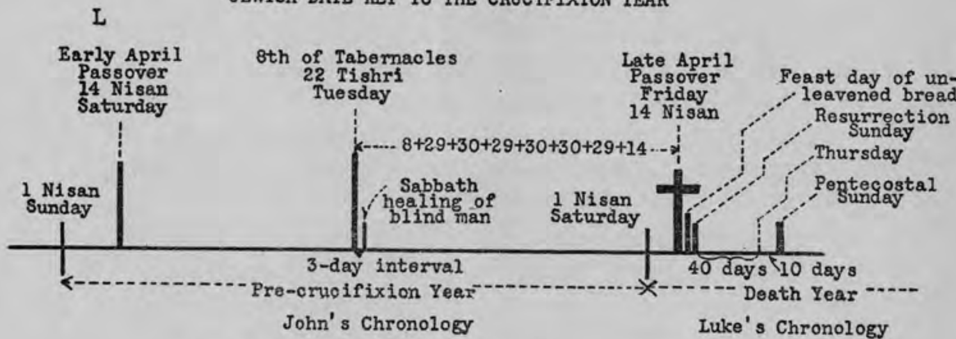
*The name and length of each month are taken from the ancient Karaite calendar. Cf. *Encyclopedia of Religion and Ethics*, ed. James Hastings, art. CALENDAR (Samuel Poznanski), p. 120.

5. *Pentecost on Sunday in the Year of the Crucifixion.* It is Luke that adds a final date confirming the year of the crucifixion — Pentecost on Sunday, as previously discussed. His "forty days" start with resurrection Sunday, ending with the Ascension. Then, by pentateuchal reckoning, ten days more end on another Sunday. And Luke's argument involves a crucifixion Friday on 14 Nisan, because he begins the feast of weeks on Sunday, thereby designating it as the "morrow after the sabbath," or 16 Nisan. The year 31 A. D. agrees with Luke's calendar. And its Sunday Pentecost is highly significant, since it shows that the Sadducees, who are reputed as holding for a Sunday interpretation of Lev 23 15, did not in any way manipulate the calendar to suit their teaching, as has been so frequently charged against them. For the year 31 gave them the Sunday Pentecost of their choice.

We now have a series of four or five Jewish dates that completely tie up the last fourteen months of Christ's ministry — approximately from 1 Nisan in 30 A. D. to Pentecost in 31 A. D. They are as follows:

JEWISH DATE KEY TO THE CRUCIFIXION YEAR



1. Pentecost = Sunday (Luke).
2. Resurrection Sunday = 16 Nisan (Luke).
3. Crucifixion Friday = 14 Nisan (Luke and John).
4. 22 Tishri = Tuesday (John).
5. Pre-crucifixion 1 Nisan = Sunday (John).

This series of dates constitutes the key to the true crucifixion year — not one date alone, but several. In four or five different

places the foregoing calendar line is locked in position in harmony with the arguments of John and the Synoptists. It is the day of the week that proves the validity of these Jewish dates, and demonstrates the harmony that existed in ancient Jewish reckoning, and between the Johannine account and that of the other writers. For a 14-Nisan Friday according to Luke leads back day by day to a 22 Tishri on Tuesday according to John — a period of 199 days.

And, according to this key reckoning of the crucifixion year,

a. The year 30 A. D. falls down as a crucifixion date because its passover on 14 Nisan occurs too early in April for the death of Christ, and because this date does not coincide with a Friday on the day *after* full moon.

b. The year 31 A. D., with a passover on Friday, April 27, meets all the specified demands of the calendar and ancient Jewish record: (1) a 14-Nisan Friday; (2) an after-full-moon Friday; (3) a late season passover; and (4) a Sunday pentecost.

VI. Other Scripture Synchronisms

Many of the later books of the Bible contain synchronal dates. These synchronisms are not all like that of the crucifixion, and yet all can be solved by the same luni-solar method. The day of the week that is most frequently tied to a scripture date is the Jewish Sabbath. Its name may not always be mentioned as such in the biblical record of the synchronism, but there will be certain descriptive phrases, or sacrificial features that will identify the seventh day of the week in ancient Jewry, and thereby establish the calendar synthesis. Once the calendrical data are known, the Julian year can be demonstrated.

In the book of Ezra there are dated incidents — seven in all — that cannot consistently coalesce with the Jewish rest-day on account of the nature of the events. And, because of this very circumstance, the year of Ezra's return from Babylon is substantiated. It has to be a year that dates each one of the Ezra episodes on an ordinary week-day — an unusual calendrical

demand! For, in a period of 16 years, there was only one such year. According to its Jewish reckoning, Ezra left Babylon on Thursday (1 Nisan), Ahava on Monday (12 Nisan), arrived at Jerusalem on Wednesday (1 Ab), weighed out the silver and gold on Sunday (5 Ab), met with reference to the domestic trial on another Sunday (20 Kisleu), started the examination on Thursday (1 Tebet), and finished on Tuesday or Wednesday (1 Nisan) of the New Year, according to a common or embolismic old year. And the year was 457 B. C., according to the reckoning of Nehemiah.

In this interesting manner the time incidents of early Jewish history are recorded. Again and again it has been said that we do not know how the Jews reckoned time in their earliest periods. Chwolson would have it that Israel has wiped out her religious past with a wet sponge.[84] And at the same time the efficacy of the standard Jewish calendar is challenged with reference to the identification of early Jewish dates. Schram allows a "near approach" only on the part of modern rabbinical calculation in verifying ancient luni-solar dates in Jewish history.

But each dated episode in Scripture has a common characteristic — a synchronal relation of one kind or another. These synthetic relations make the dated events of sacred history as important as eclipses or papyrus rolls. And so, in the interest of ancient chronology, a method of luni-solar reckoning with accompanying calendar tables is here presented. If these tables destroy a favorite theory, they also open up a new field of research, which is their redeeming feature.

VII. Conclusions

By the one simple rule of placing the 14-Nisan passover date on the next day after the Jewish day of full moon on the Jerusalem meridian, good calendar practice of the ancient luni-solar type is established, in harmony with the moon's first appearance

[84] Daniel Chwolson, *Das letzte Passamahl Christi*, Leipzig, 1908, 165.

after conjunction. And calendar measures antagonistic to astronomy and Jewish law alike are thereby avoided:

1. The passover date will never be found dancing around the full moons (*Re* Clavius).

2. The 14th or 15th of Nisan will not occur on the Jewish day of full moon in Jerusalem.

3. The Nisan phasis will never occur on or before the day of conjunction.

4. The Nisan translation period will not go much under a day in length.

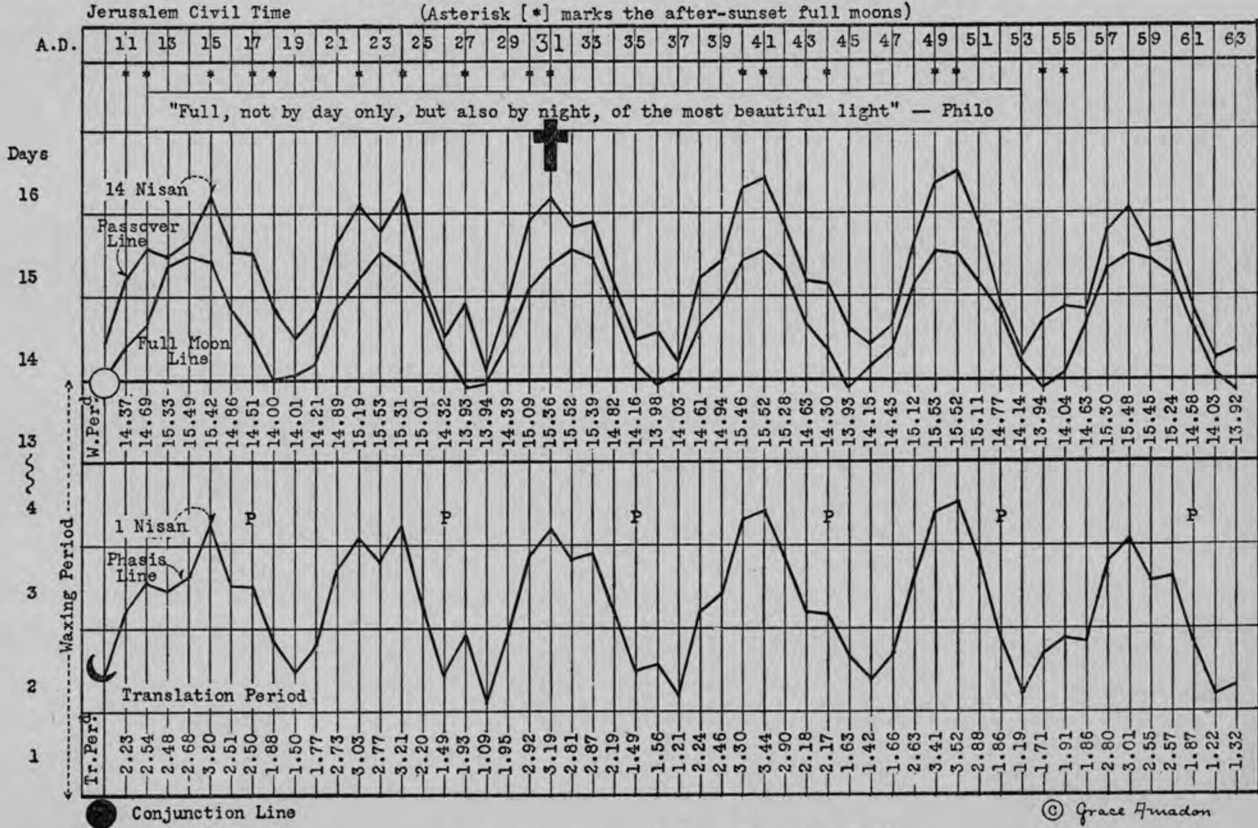
5. The Nisan translation period will not fail periodically to go to the third day after conjunction.

6. The lunar year will not be 353 or 385 days long, as in the modern Jewish calendar.

7. And there will be no March or early April passovers.

These luni-solar regulations are in harmony with the ancient laws of the Jews, and with the astronomical laws governing the calendar moon.

RELATION OF ANCIENT PASSOVER TO FULL MOON



P = Mean perigee near 1 Nisan (Brown's tables).


JEWISH FEASTS TIED TO HARVESTS
PASSOVER
PENTECOST
TABERNACLES
BEGINNING OF BARLEY HARVEST
END OF WHEAT HARVEST
AFTER VINTAGE AND OIL
WAVE SHEAF
TWO LOAVES
WINE OFFERING
APRIL AND MAY
JUNE AND JULY
SEPT. AND OCT